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PRACTICAL OBSERVATIONS

ON

GOUT AND ITS COMPLICATIONS,

*&c.*

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PRACTICAL OBSERVATIONS  
ON  
GOUT AND ITS COMPLICATIONS,  
AND ON  
THE TREATMENT  
OF  
JOINTS STIFFENED BY GOUTY DEPOSITS.

BY  
*C*  
T. SPENCER WELLS,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND ; MEMBER OF THE  
ROYAL INSTITUTION OF GREAT BRITAIN, OF THE PATHOLOGICAL AND EPIDEMIOLOGICAL  
SOCIETIES, ETC. ; LATE ASSISTANT SURGEON IN MALTA HOSPITAL.



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DEDICATION.

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TO

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SIR JOHN FORBES, M.D., D.C.L., F.R.S.,  
*&c., &c.*

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DEAR SIR JOHN,

THIS is one of the first works in which the principles of the natural cure of disease, so ably developed by you, have been practically applied to a special subject. It is the offering of a disciple of your own school of YOUNG PHYSIC, whom I trust you will find truly following in your path, while attempting to prove that, although our chief reliance must be placed upon natural means in our endeavours to prevent and cure disease, we must not neglect such artificial aid from medicine as experience can prove to be both harmless and beneficial.

I do not dedicate so slight a performance

as any sort of acknowledgment of the debt medical literature owes you. You have already received from a great number of the most enlightened men in the profession the most sincere and united thanks, on this account ; and such an offering as this would be truly a poor acknowledgment of such a debt. I, therefore, simply ask you to accept it as an expression of the deep respect and regard I should be most ungrateful not to feel, after the continual instances of disinterested kindness you have shown me during the thirteen years, I am proud to say, our friendship has lasted. Will you, therefore, receive it as a very small token of very great esteem, and thus add one more to the numerous favours for which I am indebted to your good will.

Believe me, dear Sir John,

Yours faithfully and obliged,

T. SPENCER WELLS.

30, *Brook Street, Grosvenor Square,*  
*February, 1854.*

## P R E F A C E.

---

IT is now more than thirteen years since the late Dr. Robert Williams, of St Thomas's Hospital, pointed out to me a connexion between gout and certain forms of secondary syphilis. I attended several patients with him, both in hospital and private practice, who received the most remarkable benefit from the use of the iodide of potassium, which my deceased friend gave merely as an anti-syphilitic remedy. I found, however, that this medicine exerted a solvent action upon the salts deposited around the joints in gouty persons, and, when my duties in the medical department of the navy soon afterwards led me to Malta, I determined to pursue the inquiry in connexion with gout uncomplicated by syphilis. I remained upwards of five years as one of the resident medical officers in Malta Hospital, and during this period had

repeated opportunities of carrying on my observations upon the powers of the iodide in cases of gout and rheumatic gout, among patients who had been sent to Malta for change of climate by their medical attendants in England, and in various forms of chronic rheumatism and secondary syphilis in the hospital patients. Subsequent experience in this country has enabled me to determine, in some degree, how far the effects I had observed are to be attributed to the influence of a warm climate, and how much to medicine. The results have been such, that some professional friends, upon whose judgment I place great reliance, have advised me to make known to others what experience has taught me. I have, therefore, done so as briefly and simply as I could, and I trust that the sincere desire to fairly communicate practical information which I believe to be sound and truthful, will be the best apology for the manifold imperfections I am deeply sensible of in the execution of this little work.

I do not attempt to write anything like a systematic treatise on gout, or to give any lengthened description of the symptoms by

which this disease is manifested in its common forms. Sydenham, who suffered from it in his own person, has left us so accurate an account of his own feelings, that those not similarly qualified by personal suffering, who have followed in his path, have added but little to the knowledge he imparted. Those who wish to know what has been done since his time, will find the information they desire in almost any of the systematic works on medicine of which the British press has been of late years so prolific. My object is to impart some facts which will not be found in other books, and to make certain reflections upon these facts. I shall inquire, What is gout? what are its causes? How is it modified by rheumatism? How by syphilis? How does it show itself in the female? What are the various forms of internal or latent gout? And, lastly, what are the habits, diets, exercises, climates, and medicines, by which gout may be kept off—which exert a curative influence, during an attack, in some of its various forms—which prevent a relapse, and which restore such of the tissues of the body as have been damaged by gouty deposits, to their former healthy condition. It

is with the last intention that I have principally employed the iodide of potassium, and I shall bring forward strong grounds for concluding that its efficacy is very great, and that it exerts a direct chemical action on gouty deposits which has escaped the notice of former observers.

It may be thought by some that, as a surgeon, I am intruding somewhat upon the province of the physician, in treating cases of gout, but I believe that the class of cases in which I especially recommend the iodide of potassium—cases of enlarged, stiffened, painful joints, surrounded by gouty deposits—are, in the present day, as frequently presented to the notice of the surgeon as to that of the physician; and not improperly, for the mechanical applications of friction, percussion, pressure, and the douche, constitute a most essential element in the treatment.

I may state, that the greater part of this book was written in 1848. It was announced for publication, in that year, in the *Medical Gazette*, but a variety of circumstances induced me to postpone it.

30, Brook Street, Grosvenor Square,  
February, 1854.

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## PRACTICAL OBSERVATIONS,

*&c.*

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THE nutrition and growth of the body—the wear and tear of the tissues of which it is

composed—the repair, or restoration of this continual loss—the necessary balance between deposit of new matter and removal of old—and the various modifications of the several processes by which these ends are accomplished in different states, both of health and disease, must be considered, before an answer can be found to the question, What is gout, and what produces it? on anything like scientific or philosophical grounds.

A continual change is constantly taking place in the quantity and quality of every fluid, in the composition and condition of every solid constituent of the human body. When the substance of the tissues has served its purpose in the animal economy, it is absorbed, is carried into the blood, is circulated with the blood, is regenerated in its passage through the lungs, again serves as nutriment to the body, and assists in furnishing the secreting organs with matter from which they can prepare the fluids required in various vital processes. The portions which are totally unfit for again becoming useful to the body are thrown out of the system by the excreting ducts of the skin, mucous membranes of the

lungs and alimentary canal, and by the excretory glands. Exercise of the body, the use of its various parts, the performance of its functions, lead to a continual waste of its component structures. To supply this waste food is converted by the stomach and accessory organs into a fluid, adapted for assimilation with the blood. This fluid is carried into the blood, just as the latter is returning to the heart, after having deposited its nutritive particles throughout the system, after having supplied the secreting organs with matter upon which to operate, and after having been purified by the excreting organs from offensive and useless substances. With the nutritive matter just prepared from the food, the blood also soon afterwards receives those portions of the animal tissues which are unfit to fulfil their various duties, and this effete matter passes with the newly assimilated or partly assimilated nutriment, mixed up in the old blood, through the lungs. The mixture is there oxygenated, is freed from aqueous, carbonized, and other superfluous ingredients during its passage, and returns to the heart to be circulated through every organ and tissue,

maintaining life and heat, depositing nutriment, becoming deteriorated by these contributions, again to be renewed and revivified by a continual repetition of the same series of processes.

This is the healthy performance of the conditions necessary for nutrition and growth ; and a moment's reflection will serve to show how many circumstances must combine harmoniously to ensure this healthy performance, and regulate the delicate balance between the nervous, respiratory, circulating, digestive, secreting, and excreting systems. The minute blood-vessels, and absorbent vessels, by means of which deposit of new and removal of old matter is effected, must receive a due and regular supply of nervous influence ; and to ensure this the nervous system must be in a healthy condition, and the brain be regularly exercised. These minute vessels must also receive a due and regular supply of healthy oxygenated blood. To ensure this the digestive organs must be sound. The food must neither be redundant nor deficient. It must be wholesome in quality, and consist of such a mixture of animal and vegetable matter as is

best adapted to supply the wants of the various parts of the body. It must pass through sound lungs, which are regularly supplied with pure atmospheric air of a natural temperature. The heart must be healthy, and must be assisted in its duty of propelling the blood through the minutest ramifications of the vessels by a proper amount of active exercise. The blood must also be freed from its impurities—from the old matter which has served its purpose, and from the new matter which is superabundant or unwholesome—by a free and regular action of the exhalant vessels of the skin, mucous membranes, and every excreting organ. Unless this be the case, the system, instead of being supplied with new, fresh, renovating, nutritious matter, is supplied with its own worn out or dead tissues, with compounds which ought not to be again circulated with the blood, but which ought to be thrown out of it as excrementitious.

If we inquire what chemical changes are produced in the blood by derangements of the processes of nutrition, and how far these chemical changes are the causes of the symptoms

by which gout is recognized, it is necessary also to determine to what extent these changes are owing, on the one hand, to the presence of "used up" bodily tissues, which ought to be thrown off, and, on the other, to the introduction of superabundant, stimulating, or imperfectly assimilated matter, from the digestive organs.

Chemical analysis of the blood of gouty persons has proved, that certain substances exist in it which are not found in the blood of healthy persons, or, if found, are so in very much smaller proportion. A further analysis of the urine, perspiration, and of the matter deposited around the joints, and in other parts of the body, has proved, by identity of composition of morbid matters thus excreted from the blood with those circulating in it, that the blood clears itself from these impurities by pouring them out in a state of more or less perfect solution through the ducts of the excreting organs, or by allowing them to exude, or permeate, or become extravasated from the capillaries of tissues around joints, and deposited upon these tissues upon one or other surface, or among the interstices of the fibrous

tissue, in whatever part of the body it may be found—whether in aponeuretic expansions, in the sheaths of tendons, in the fibrous tissues of the eye or testicle, in the fibrous envelopes of the brain, spinal marrow, or nerves, in the coats of the blood-vessels, in the fibrous coats of the abdominal or thoracic organs, or in the fibrous structure of the uterus.

In the present state of organic chemistry, the exact chemical constitution of the substances found in the blood of gouty persons, and poured off from the blood by means of the skin and kidneys, which would not be so poured off in healthy persons (because, not existing in the blood at all, or only so existing in a minute fractional proportion, there is either no possibility of their appearance, or no necessity for their elimination), has not been accurately ascertained. It has been too common to accept assertions which have not been confirmed by trustworthy observation, and the dangerous error has been too often committed, of making practice accord with theoretical views the truth of which has not been positively established. No chemist, known to be experienced in the processes of organic ana-

lysis, has made a sufficient number of careful examinations of the blood and secretions of gouty persons, to demonstrate clearly how these fluids depart from their healthy condition, and in what state their unnatural contents are found in different forms of gout, and in the same gouty patient at different periods. This is a subject which still requires to be worked out by careful, trustworthy, and experienced chemists, who will assist the medical attendant, and perform for him a duty for which his occupations, habits, and education, but seldom fit him.

Something, however, has been done in the right path. Haller (*Comm. litt. hebd.* 21) stated that he had seen small calcareous particles so abundant as to be visible to the naked eye, floating in the blood of a gouty person. Dr. Jahn, of Eisenach, a German physician, who wrote two very singular books on Pathology and Practical Medicine in 1835 and 1836, found crystals of certain salts in the blood of gouty persons. Dr. Garrod published a very important paper, in 1848, in the *Medico-Chirurgical Transactions*, in which he showed that the blood, in four cases of gout, contained

lithic acid in the form of lithate of soda. He believes, that in cases of chronic gout, with chalky deposits around the joints, lithic acid is always present in the blood and deficient in the urine, both absolutely and relatively to other organic matters. In one of Dr. Garrod's patients of this class, the quantity of lithic acid was greatly diminished, while the other solids of the urine were in healthy proportion. Dr. Garrod, also, found a little urea in the blood of one gouty patient, no albumen being present in the urine. He thinks that this occasional presence of urea may explain the frequent occurrence of œdema in gout, as this symptom is so constantly present in cases of Bright's disease, when the blood contains a large amount of urea. It must be remembered, however, that minute traces of urea have been found in the blood of perfectly healthy persons.

More recently, Dr. Bence Jones (*Animal Chemistry*, p. 29—32) has found lithate of soda in the blood of two gouty patients. His method of analysis is very simple. The clear serum is poured off from the clot and evaporated at 212° Fah. to perfect dryness. The dried mass is reduced to very fine powder, and

then treated with distilled water at 100° Fah. for an hour. In this way all the lithate of soda in the dry mass is dissolved. The solution is then evaporated until but very little remains, and strong acetic acid is added. Acetate of soda is formed and lithic acid is set free. In the course of a few hours the lithic acid crystallizes. It appears like small grains of cayenne pepper, and under the microscope exactly resembles lithic acid crystals from the urine. If they are treated with nitric acid and ammonia, the usual pink reaction is clearly obtained.

The chemical characters of the secretions and excretions of gouty patients have been more fully investigated than those of the blood itself. Still much remains to be accomplished, although the general doctrine may be considered as established, that the blood contains certain substances it should not contain, that these substances must be either thrown off from the blood in the secretions or excretions, or be deposited in or around the joints, or continue to act as a poison in the blood, to circulate with it, and disturb, to a greater or less extent, the performance of the functions

of every organ, the physical characters and chemical composition of every tissue.

The kidneys and skin are the principal organs which purify the blood from the effete matters it contains. It has been long a matter of common observation, that the urine of a large proportion of gouty persons habitually contains a far larger quantity of lithic acid or the lithates, than the urine of persons in health. Dr. Prout, the most eminent pathological chemist of the age, considered the development of lithic acid as the “characteristic feature in gout.” Berthollet found that, at the commencement of a gouty attack, the amount of lithic acid in the urine is not only diminished, but is actually below the healthy average proportion. Dr. Garrod has confirmed the truth of this observation, and has shewn that when a gouty attack is going off, lithic acid and lithate of ammonia have been abundantly thrown off from the system in the urine. In the fourth chapter further remarks will be found on this part of the subject.

The cutaneous excretion is also peculiar in gouty patients. It has been often observed, and I have noticed it myself very frequently,

that the skin, over any joint attacked by gouty inflammation, is bedewed by a perspiration so acid that it instantly reddens litmus paper. If such a joint be covered with dry lint, and the whole be enveloped in oiled silk, the lint in the course of a few hours becomes completely saturated with an acid fluid, which often contains as much as 8 per cent. of solid constituents,—being animal matter and salts, varying in proportion and composition with the state of the blood. Stark and Wolff have found lithate of soda in the perspiration of gouty patients; and Dr. Simon, who examined that of two such persons who had been under the cold-water cure for ten and twelve weeks respectively, found it to contain chloride of sodium in large proportion, carbonate of soda, a little phosphate of lime, and a fair amount of sulphuric acid. Dr. Golding Bird states that he has seen a patient bed-ridden from rheumatic gout, whose legs were covered with an eczematous eruption, and the parts on which the exudation had dried were actually frosted with microscopic crystals of lithate of soda. (*Urinary Deposits*, p. 104.)

I am not aware of any observations which

have been made to determine how the pulmonary exhalations of gouty persons differ from those in a healthy state.

There can be no doubt that the secretions of the digestive organs, and the excretions of the mucous membrane of the alimentary canal, also free the blood, in an important degree, from its morbid contents, but it has not been yet determined, by chemists, to what extent they do so in cases of gout, although Morgagni, Leroy, and Baglivi (*Dict. des Sciences Med. Art. Goutte*), all speak of discharges from the bowels, resembling chalk or gypsum, after sudden cessation of gouty attacks. Leroy, especially, supposed that the chalky matter contained urea; and I attended a nobleman, in the year 1851, who repeatedly passed copious chalky evacuations, which, on examination by the microscope, proved to be a mixture of alkaline and earthy phosphates, lithates, and carbonates.

After repeated attacks of gout the kidneys and skin lose their power of purifying the blood to a great extent, and then the morbid matters it contains are deposited in or around the joints, or in some of the fibrous tissues. When

first effused, the matter which collects around the smaller joints may be squeezed through a very minute puncture, and it is found to be a white tenacious albuminous fluid, containing quantities of crystalline substance. Vauquelin found, in one specimen, lithate of soda and a small proportion of lithate of lime, with cellular *debris*,—and, in another, sublithate of soda, lithate of lime, phosphate of lime, and animal fibre. Dr. Petit (*British and Foreign Medical Review*, vol. xiv. p. 227) found this effusion to be “composed of albumen in large quantity, about four-fifths of lactic and phosphoric acid, chloride of soda, phosphate of lime, and evident traces of urate of soda.” Dr. A. Ure examined these concretions in their harder state, after the fluid portion had been absorbed, and found that they consisted of lithate of soda, with occasionally a small proportion of lithate of lime. (*Medico-Chirurgical Transactions*, vol. vi. Second Series.) Dr. Prout finds that in this state they consist chiefly of lithic acid, combined with soda in different proportions, forming a lithate or superlithate of soda. Cruvelhier has found phosphate of lime in varying proportions, in some cases exceeding

in quantity the lithate of soda. Laugier and Wurzer have found that they consist of lithate of soda, with a little lithate of potass and lime, chloride of sodium, and a varying proportion of animal matter and water (Simon, *Animal Chemistry*, vol. ii. p. 477). Lehmann's analysis, quoted by Dr. Garrod, gives 52 per cent. of lithate of soda, 1 of lithate of lime, 14 fixed salts, and 32 cellular tissue and water. In Dr. Garrod's cases the concretions consisted of bundles of crystals of lithate of soda, united in masses, the crystals varying greatly in size. I have never examined these deposits or concretions chemically, but I have frequently determined their nature by the form of the crystals under the microscope, and I believe that, on the whole, this is the more satisfactory and precise method. A drop of the effusion, when soft, or a few particles of the hard concretion, placed upon a piece of glass, will thus show at once the characteristic forms of crystallization of the various salts, and there can be no suspicion that their nature has been altered by any chemical process adapted for analysis.

Microscopical observation has convinced me that the composition of these concretions varies

very much in different persons, and in the same person at different periods. When there is general plethora or an inflammatory tendency, or when the system is supplied by active digestive organs with superabundant nutriment, lithic acid or the lithates at times abound in the urine, at others are deficient; and the lithates, with albuminous matter, compose the gouty concretions. When, on the other hand, the general health of a gouty person has been broken up by long continued suffering, by mental anxiety, or any other depressing cause,—when the digestive organs cannot prepare nutritive matter of good quality, or in sufficient quantity, to supply the wants of the system,—then the body feeds upon itself: its own half-dead tissues are its food; the phosphates form in the urine, and are deposited around the joints.

The CAUSES of the derangements of the processes of nutrition, which give rise to the chemical changes just described, must now be considered.

1. Among the most important of these causes we may probably assume, in many cases, an *hereditary tendency* to particular modifications

of the vital processes. The fact that gout is an hereditary disease,—that the children of gouty parents are more subject to it than those of others,—has been acknowledged by all observers, and no doubt can be entertained on the subject by any one who has seen much of the disease, and has noted the extreme frequency with which the parents of gouty patients are found to have been also gouty. Different explanations, however, have been given of the fact. Some consider that the children would naturally follow the example of their parents and thus become subject to the disease, not by inheritance, but from the operation of the same causes which produced it in the ancestry. That this explanation would, in many cases, be satisfactory, is no doubt true; but there are other cases in which the most extreme care has been taken, from birth upwards, to secure children from the effects of congenital peculiarities,—from the tendency to disease a gouty parent has entailed upon them,—yet still the gout has appeared; doubtless in a modified form, and with less intensity, yet obviously and clearly developed. I am acquainted with a family in which this

is most marked. The father inherited gout, and has suffered from it for years in an extreme degree. The mother is perfectly healthy. The physical education of the children has been most admirably conducted ; the most judicious care has been taken with regard to their diet, exercise, and habits ; yet, although the eldest son is not yet eighteen years of age, he has had three distinct gouty attacks, and the gouty constitution is clearly apparent in the other children. I very recently attended a gentleman who informed me that he was one of a family of six, who were all brought up in a similar manner. His father had not been subject to gout until after the birth of the fourth child. None of the four elder children had suffered from any gouty attack. Between the births of the fourth and fifth children the father had a severe attack of gout, and died of the disease some years later. The two children born after the attack of the father were both gouty. The mother had never had any symptom of the disease.

The observations of others prove that these are far from being solitary examples ; and it would appear, therefore, that as a parent

transmits to his children certain peculiarities of form and feature, difficult to define but universally recognized, so he transmits a certain power or tendency to the germ he impregnates, which causes the development of a body in precise imitation of that of its ancestor. Mr. Paget has forcibly expressed this doctrine in his admirable lectures, delivered at the College of Surgeons. He says (*Medical Gazette*, June 15, 1849) : "With reference to certain modern theories, explanatory of repair and reproduction, it will appear, I think, that both in these, and in the processes of common nutrition, a power is in exercise which is not admitted by the cell-theory, or by organic chemistry,—a power continuous with that manifested in the germ, and acting in all essential things like it.

"The characteristic property of an impregnated germ is, that when placed in favourable circumstances, all the materials of which it first consists, and all that it appropriates, are developed according to the same method as was observed in the development of its progenitors,—in other words, in conformity with what we may regard as a law of specific cha-

racter. In all the wonders of development that my colleague has detailed, none, I think, appeared more marvellous than the constancy, the seeming tenacity of purpose, with which the germ is thus developed to the likeness of its parents. However vast its power of multiplication and increase,—however various its metamorphoses,—however far in some of these changes it may deviate from the form in which its parents generated it,—however near in some it may approach the perfect characters of another species,—or, which is stranger still, however much alike all germs may be in their primal structure and earliest developments,—yet, through all these things, each germ moves with unswerving progress, guided by the same Power as created its first parents, to the formation of a being in which the parental form and properties are reproduced."

Whether this hereditary tendency is manifested by the blood undergoing modification with more than usual readiness,—whether the metamorphosis of tissues is irregularly carried on,—whether certain organs are less capable of purifying the blood than in other cases,—or whether the nervous power which should main-

tain healthy nutrition of the body is imperfectly or irregularly developed, owing to transmitted peculiarities of nervous organization, we know not. Science has not yet determined in what precise manner the blood, nervous system, or general conformation of the children of gouty parents differ from those of other children ; it is by observation alone that we know that some difference must exist. This truth, however, should be no discouragement to those who hope, by a good physical education, to eradicate constitutional disorders ; on the contrary, it should serve as a warning that such an education is more than commonly imperative, and it will be satisfactory to know that in the vast majority of cases it would prove entirely successful, and in the few exceptional instances would greatly mitigate attacks in intensity, and diminish their frequency.

2. Closely connected with hereditary predisposition to derangements of the process of nutrition, is the subject of undue or irregular development of certain parts of the nervous system, as a cause of such derangement. It is the opinion of some persons that they could produce gout in any man by keeping him in

idleness in a large town, and feeding him excessively upon stimulating and highly nutritious food. I believe that in cases where there was no hereditary predisposition to gout, they would only succeed in men endowed with a highly organized condition of the nervous system, even when they had fulfilled all the above conditions. Sydenham observed, that gout killed "more wise than fools." Cullen said, that it affected especially "men of large heads." And, to come to one of the most careful observers of our own times, Dr. Watson refers to the "fact" that gout is "peculiarly incidental to men of cultivated minds and intellectual distinction." Doubtless the more sedentary habits of men of cultivated minds, and the depressing effects of mental anxiety, and intellectual labour too ardently pursued, tend to diminish bodily vigour, but this is not all. Among the present members of the Houses of Parliament, those who are known to be subject to gout are among the most distinguished for an ancestry rendered illustrious by "high thoughts and noble deeds," for their own keen intelligence, for the assistance they have afforded to improvements in arts, science,

and agriculture, and for the manner in which they have led the spirit of the age. If it were proper to mention names, I believe I could prove this to be the case, and I never met with a real case of gout, in other classes of the community, in a person not remarkable for mental activity, unless the tendency to gout was clearly inherited.

It is perfectly true that butlers, hall porters, and other individuals in equally easy circumstances, are often subject to gout, but many such persons are the sons of parents who have lived in similar situations, and have received from their progenitors hereditary predisposition. I have seen a great many examples of the rule, and scarcely an exception, that when a person in an inferior station is subject to gout, and one of his parents was not similarly affected, he is a person of superior abilities or attainments; and I feel perfectly convinced that the state of general fulness of the blood-vessels, the corpulency, the apoplectic and erysipelatous affections, the ulcers on the extremities, and other diseases, which prove so fatal to the idle and over-fed servants of our aristocracy, differ as much from the gouty diseases

of their masters, as the brains of the two classes do in their organization. Some may doubt whether there really is such difference of organization ; but, putting aside all question of race, let us ask whether it be reasonable to suppose that a father and mother, descended from persons who had cultivated their minds, and thereby kept the delicate fibrils of the brain in regular exercise, and who themselves continue to perfect the organism they have inherited by a continuance of the same habits of mental culture, will impart to their children a brain precisely similar in size, composition, and arrangement, to that of children whose parents and earlier progenitors have lived in a state of mental sloth, who have never exercised their brains, have never called forth its powers, and have consequently never attained the perfection which use imparts to every organ of the body. Such a supposition would be absurd. It would imply imperfection in the grand scheme of creation, denial of the greater perfectibility of the species, disbelief in the sure and certain progress of advancing civilization, and discourage those who are most earnestly labouring in the cause of education and humanity.

Every organ of the body is perfected by due and proper exercise, and is deteriorated when not so employed. The mental powers, in the same way, are increased by proper cultivation, and the brain, which is the organ of the mind, must participate in the increase of its functions. Parents communicate to their children their likeness, many peculiarities of person and disposition, their diseases, both of mind and body, and it would imply, I repeat, imperfection in the plan of the Creator if the diseases—the effects of the vice and folly of the parents—even their insanity—could be, as we know they are, communicated to their children, while health and understanding—the results of physical and mental education in perfecting organization—were not transmissible, in at least as great a degree as certain habits, the result of education, which some of the lower animals transmit to their offspring.

If we admit, then, that the educated classes, independently of the influence of race, transmit to their descendants a more highly developed nervous system, than the non-educated, it must be remembered that it would imply a far greater imperfection in the scheme

of creation, if the improved nervous organization obtained by mental cultivation, should necessarily entail upon the possessor a tendency to physical defect, or a predisposition to actual disease. So far from this being the case, all experience has shown, from the days of Hippocrates and Celsus to our own times, that a sound mind is the best preserver, and ought to be the general inhabitant, of a sound body. But in gouty cases we have to deal with nervous systems irregularly developed, with brains irregularly exercised,—overwrought at one season, left idle at another. The spinal marrow, the sympathetic system, every nervous fibril in the body, participates in and suffers from the irregular supply of nervous influence, which at one season is exhausted by the brain, at another is left to the undivided disposal of the physical wants of the system. Venereal excesses tend to produce great derangement of the nervous system, and many gouty attacks follow the excessive indulgence of the passion. In some cases the desire is purely morbid, being produced by the mechanical irritation of the urinary sediments about the neck of the bladder.

All this applies especially to the male sex, but similar causes produce analogous effects in the female. Their primary organization is more delicate than ours, their physical powers are less developed in early years by active exercise, their natural disposition and domestic habits, the high cultivation of the fancy and imagination in their education, would, I believe, lead to a more general development of gout in them than amongst ourselves, were the tendency not counteracted by their comparatively abstemious habits. Even then, however, it will be seen, in the fifth chapter, that females are very subject to several forms of latent gout which are very seldom recognized by the physician.

The practical bearing of all this is obvious. The minute vessels which supply the waste of the body by depositing fresh nutriment, which remove useless matter, and which separate from the blood all the impure and noxious particles it contains, do all this under the influence of the nervous system. They do not do it properly unless duly excited by a regular supply of nervous energy. When the brain is irregularly developed, irregularly exercised,—

when it is left in idleness more or less complete for one season of the year, and over-worked in the other—when the intense study, close attention, violent passion, and alternations of excitement and depression inseparably connected with the practice of gaming, are nightly persisted in—when the very composition of the brain is altered from the circulation of blood through it which has been but imperfectly oxygenated by the air of crowded public assemblies—it cannot regularly develope nervous power, it cannot regularly distribute this power throughout the body. The spinal and sympathetic systems participate in the disturbance, and the consequence is, that the nutritive and absorbent vessels cannot act with precision—their balance is lost—they do not deposit or remove what they ought—and the blood becomes charged with superfluous or impure matter, which must be got rid of in some unnatural manner: by undue excretion, or by deposit in some unusual situation. The tissues and organs, instead of being renovated and perfected, remain partly composed of matter which has been, or ought to have been, “used up,” and they are consequently unable to fulfil

their several offices in a proper manner. The derangement of one organ increases that of others. The whole system is deranged, and the evil, which was the first cause of imperfection and failure, is increased by its own effects. Thus, in a continual series of reactions general alteration of the whole blood is produced. Its chemical composition and physical characters are altered. Derangement of every part which is dependent upon a proper supply of pure blood for perfection and even vitality ensues. The alteration in the whole of the blood of the body resulting from a loss of balance between the nervous and circulating systems not only concurs with other causes in producing gout, but I believe it to be an important, if not an essential, element in its production.

3. Undue, irregular, or imperfect assimilation of nutriment by the digestive organs, must be next considered as influencing and deranging the processes of nutrition.

Supposing the digestive organs to be perfectly healthy, it is quite clear that, in order to supply the wants of the different parts of the body, the stomach must receive a proper quantity of food, adapted by its nature to the vary-

ing circumstances in which the body is placed. The substances which enter into the composition of the various articles of food and drink used by man, are, first, fibrine, albumen, gelatine, hæmatosine, and oil or fat, which, under various combinations, form different kinds of animal diet. Secondly, starch, sugar, gluten, and gum, which, with vegetable albumen, form the different kinds of vegetable food. Thirdly, water and alcohol, which, with various acids and vegetable aromatic additions, are employed as drinks. All these substances are composed of certain chemical elements in varying proportion, of which the principal are carbon, hydrogen, oxygen, and nitrogen, and certain metallic bases in small proportions. The tissues of the body are composed of the same chemical elements, and as these tissues depend for their support and healthy condition upon a due and regular supply of their constituent elements, so any excess, deficiency, or irregularity in the supply, sooner or later, induces disease. These elements must also be applied in that form of combination which is best adapted to the wants of the system at the time. Thus, cer-

tain combinations of these elements form fibrinous, others albuminous, gelatinous, oily, amylaceous, or saccharine substances adapted to nourish the fibrinous, albuminous, or gelatinous tissues respectively ; and to supply carbon as fuel for the support of animal heat and the saponification of oily food. Liebig's doctrine is now very generally adopted, that the tissues of the body can only be duly nourished when the food contains the elements of which the tissues are composed in nearly identical forms of combination, and that the substances resulting from their combinations, when taken as food, should be altered as little as possible by artificial additions or preparations.

Solid food, in whatever proportion its chemical constituents are arranged, consists of digestible and indigestible matter. The digestible matter again consists of substances which do, and of substances which do not, contain nitrogen. The former nourish the bodily tissues, the latter support animal heat. Thus, to maintain a state of health, the diet must consist of a mixture of nitrogenized and non-nitrogenized substances, adapted in quantity and form of combination to supply those tis-

sues with nutriment in the proportion which is necessary, and to maintain the heat of the body at the natural standard. As the fibrinous, albuminous, or gelatinous tissues, waste and are absorbed, so must they be repaired by a proportionate supply of fibrinous, albuminous, or gelatinous articles of food, not sole or uncombined, but so arranged that the substances most required should preponderate. Again, as the external temperature varies with changes of climate and clothing, so the internal temperature must be regulated by a due supply of the amylaceous, fatty, and saccharine substances, which afford carbon for combustion in the respiratory process.

Excessive quantity of food, in itself wholesome, whether consisting of animal or vegetable food, or of a mixture of both, provided the latter consists principally of bread from wheaten flour (which contains a large proportion of nitrogen), leads to the accumulation of nitrogenized substances in the blood, or to increased activity of the excreting organs for the removal of these substances. An excess of farinaceous, saccharine, or oily substances, on the other hand, affords an inordinate supply of

carbon, and this leads to an undue development of animal heat, increased activity of the cooling processes, or the accumulation of carbonized substances in the system, especially to excessive deposit of fat. The bile, for example, consists of 48 parts of carbon, 42 of hydrogen, 13 of oxygen, and 1 of nitrogen. A considerable proportion of the bile formed passes off as excrementitious, and thus the liver assists the lungs in eliminating superfluous carbon from the body. Another portion of the bile contributes, with the pancreatic juice, to saponify fatty articles of food. The bile is formed by the liver, partly from the worn out tissues of the body, partly from amylaceous, saccharine, or fatty food. If this kind of food be in excess, the carbon with which it abounds being thrown by the digestive organs and their absorbents directly into the blood, supply the liver with materials for bile which it would otherwise form from the disintegrating tissues. In this way excess of carbonized food prevents healthy nutrition, by impeding the proper removal of effete matter. On the other hand, if carbonized food be wanting, bile must be formed for the purposes of digestion at the ex-

pense, first, of the fat deposited in various parts of the body, and then of the other bodily structures.

Again,—just as the liver throws off superfluous carbon in the bile, so the kidneys throw off superfluous nitrogen in the urine. Urea consists of 19 parts of carbon, 47 of nitrogen, 7 of hydrogen, and 27 of oxygen. Lithic acid consists of 36 of carbon, 34 of nitrogen, 2 of hydrogen, and 28 of oxygen. Majendie showed, by direct experiment, how greatly the quantity of these substances in the urine was increased by nitrogenized food. Just as the bile is formed from the worn out tissues and carbonized food, so the urinary constituents are formed from these worn out tissues and nitrogenized food. If this food be furnished in excess, compounds in which nitrogen predominates accumulate in the blood, or give rise to increased activity of the kidneys for their removal. The kidneys are thus fully employed in removing the nitrogenized substances supplied by the digestive organs. They cannot also perfectly remove the products of the disintegrated tissues; the latter therefore accumulate in the blood. In this way nutrition

is doubly deranged : first, by imperfect removal of effete matter ; secondly, by vitiation of the blood, which is no longer a healthy nutrient fluid.

Dr. Golding Bird gives the following table, to show the average quantity of nitrogen and carbon evolved from the system in 24 hours, in the form of urea and uric acid :—

	Quantity excreted in 24 hours.	Nitrogen existing in.	Carbon existing in.	Nitrogen calculated in cubic inches.
Urea . . .	Grains. 255.	Grains. 118.95	Grains. 50.92	391.4
Uric acid	8.1	2.52	3.23	8.3
Total	263.1	121.47	54.15	397.7

Dr. Gairdner gives the case of a gouty patient who passed 36 ounces of urine in 24 hours, and in this urine 4 parts of urea in each 1,000 parts had disappeared. It follows, that 68 grains of urea, which should have passed off by the urine, must have been retained in the system in some noxious form or other.

Now the nitrogenized products—the urea,

the lithic acid, and the lithates, which are found in the blood of gouty persons, which are discharged in their urine and perspiration, and which are deposited in their fibrous tissues, are the result of deranged nutritive processes —of disturbance of the chemical changes which take place during the removal and repair of the bodily tissues; and among the causes of this derangement or disturbance is the inordinate supply of nitrogen in the food. This inordinate supply may take place, although the total amount of food taken is not excessive, for the proportions of the different articles of diet may be so arranged as to produce nearly the same effects upon the system as excessive quantity. Without consisting of a greater weight of solid food than a healthy person requires, the diet may be, and very often is, almost exclusively composed of nitrogenized substances, such as animal food, wheaten bread, and other albuminous vegetable substances. The necessary result is an accumulation in the blood of compounds in which nitrogen predominates, and efforts for their expulsion, which derange the excretory organs to a greater or less degree, andulti-

mately establish confirmed disease. Diseased excretions generally are too much ascribed to primarily disordered action of the excreting organs, and not sufficiently so to the existence of products in the blood, which the excreting organs must remove to preserve the health of the body.

4. The fluid portion of the diet exercises a very important influence upon the process of nutrition. All alcoholic drinks—all spirituous, vinous, or fermented liquors—must, from their chemical composition, be regarded, not as substances which can directly nourish the body or renew the tissues of which it is composed, but simply as substances which temporarily stimulate the nervous system, and which contain a large proportion of hydrogen and carbon, and serve as combustible materials from which the lungs generate the heat of the body, oxygenating the hydrocarbon circulated through them in the blood, and forming carbonic acid and water. In this light, apart from their purely stimulating properties upon the nervous system, and as articles of diet, alcoholic drinks can only be regarded as similar to oily, amylaceous, or saccharine substances, assisting in

the generation of animal heat, but not containing, as most oily or amylaceous articles of diet do, other substances which can be converted into animal tissue.

The changes which take place in the lungs during respiration purify the blood from the hydrocarbon it contains; and Dr. Prout has shown, by a series of experiments, that the process of purification is considerably retarded by the presence of alcohol in the blood; the quantity of carbonic acid exhaled being decreased after alcoholic drinks had been taken, the diminution continuing until all perceptible effects of alcohol had passed off, and the quantity afterwards rising much above the natural standard. This clearly proved that carbon, which ought to have been burnt off, had been unnaturally detained in the blood until the hydrogen and carbon composing the alcohol had been got rid of. In a warm climate or season the purification of the blood is still further retarded by alcoholic drinks. The same amount of animal heat is neither required nor generated, consequently, less carbonic acid is exhaled; more time is required to expel the carbon of the alcohol, and the whole body is

subjected, for a longer period, to the influence of impure, imperfectly decarbonized blood, circulating through its various organs, and depositing an unnatural amount of carbonized matters.

Abundant evidence has been adduced by the advocates of the temperance and total abstinence societies, from the testimony of naval surgeons, and of captains of ships employed in northern latitudes, from official reports of the health of troops serving in tropical climates, from the statements of experienced agriculturists, directors of large factories, iron foundries, gas or glass works, and similar establishments, to prove, that under the greatest varieties of climate, under every extreme of artificial temperature, under the most severe and constant labour, perfect health may be maintained by those who totally abstain from all kinds of spirituous and fermented liquors. It would also appear that even a moderate habitual employment of them is more or less injurious, and further, that all alcoholic drinks are not only unnecessary to persons in a state of health, but that they must be more or less injurious, very much in proportion to the

quantity taken, by retarding the purification of the blood during respiration, and thus interfering with the process of nutrition.

To those predisposed to, or suffering from, gout, they must be still more injurious, because such persons, above all others, require perfect purification of the blood, and rapid elimination of the worn-out tissues. There are cases, however, as we shall see hereafter, in which, from long continued disease and suffering, the whole system is so much debilitated that more or less wine becomes absolutely necessary. The digestive organs may be so weak that they cannot prepare or assimilate sufficient nutriment to supply the wants of the body without the assistance of some stimulus, and in such cases alcohol, in some form or other, is useful, not directly by affording nourishment, but indirectly by assisting the digestive organs to act upon solid nutritive substances. In another class of cases, also, where without much debility constant coldness of the hands and feet shows that the extreme capillaries are inactive, and when friction only affords temporary warmth, a little wine occasionally appears to be of service, by stimulating the circulatory system.

Other means of invigorating the body, however, should be adopted, and the wine omitted as soon as possible. Again, in cases where the phosphates are beginning to deposit in the urine, and the joint deposits are increasing, some of the light and Rhenish wines appear to have a far more beneficial effect than any medicinal preparation of acids without alcohol.

These remarks upon the influence of diet upon the nutritive processes, may be considered as the general principles which should regulate the diet of gouty persons. Their detailed application will be found in the sixth chapter.

5. Reference has just been made to the purifying process the blood undergoes during respiration. One cause of impediment to this process has been pointed out; another very obvious one is the inhalation of impure air.

The process of respiration has been well described by Dr. Arnott, as "ventilating the blood passing through the lungs, by constantly renewed quantities of pure air admitted to it."

When properly supplied with pure air, the lungs free the blood from water in combination with carbonic acid and a fractional pro-

portion of animal matter, with any volatile or odoriferous substance which may have been recently taken into the system. Lavoisier and Seguin have proved by careful experiments, that, on an average, the lungs exhale 11 grains, and the skin 7 grains of fluid per minute ; the quantity of matter thus thrown off from the blood in 24 hours, varying from the maximum 5 pounds, to the minimum 1 pound and three-quarters, the average quantity of solid constituents being about a third of an ounce, and the remainder chiefly water with carbonic acid and nitrogen. The solid constituents are principally saline. It is clear, therefore, how very important it is that no impediment should be offered to the regular performance of this process of purification of the blood, but that means should be taken to secure the perfect ventilation and proper temperature of all rooms inhabited, and of all places frequented, by the healthy, and still more so by those who desire restoration of lost health. The same facts will also explain the marked effects of changes of weather upon gouty persons. A quantity of aqueous vapour, literally water, is thrown off from the lungs.

It may be seen in cold weather, and in warm it is readily condensed upon cold glass. It is seen upon the windows of the bed-rooms in which persons have been sleeping, especially when the rooms are imperfectly ventilated. Now, the ventilation of the apartment, and the temperature, density, and hygrometric condition of the atmosphere, bear close relations with the quantity of this exhalation, and with the amount re-absorbed by the lungs, thus materially affecting the condition and composition of the blood, which is, or ought to be, freed from superfluous carbon, water, and such volatile substances as have been conveyed with the food, or from the disintegrated tissues into the blood. The following extracts from a publication of mine, upon the climate of Malta, may serve to illustrate these statements :

“ The amount of moisture suspended in the atmosphere is a most important consideration in the study of the character of a climate, independently of the fall of rain, and one too much overlooked, particularly in warm countries. At low temperatures, comparatively little aqueous vapour can exist in the atmosphere ; but at higher temperatures, the

quantity very rapidly increases, and becomes doubled in the same space, at every increase of  $16^{\circ}6$  Fahrenheit. The air, until completely saturated with moisture, is capable of taking up an additional quantity, so that evaporation from the surface of that body, and consequent lowering of its temperature, are not only affected by the warmth and motion of the atmosphere, but also by its different degrees of capacity for absorbing moisture. Cold air is the chief chilling agent to the surface of the body in northern climates ; air in motion, and evaporation in southern \* \* \* \* \* at the temperature of  $83^{\circ}$ , for example, the capacity of the air for moisture may be so great that a difference of  $25^{\circ}$  between the readings of the dry and wet thermometers, occasionally shows the rapidity of evaporation which is going on, and in a few hours, the air under a change of wind may be so completely saturated, that the readings of the two bulbs are identical, the temperature of the air remaining the same. This I have often observed in Malta. The effect this must have upon the animal body will be still more apparent when it is added that the weight of vapour in a

cubic foot of air in the one case is nearly 12 grains ; in the other, but little more than 3 ;—that in one case the air is completely saturated with moisture ; in the other, 8 grains and a half of water are required for the saturation of each cubic foot ;—that the degree of humidity of the atmosphere, in the case of complete saturation considered as 1·000, in the other case is only 0·289 ;—and that a cubic foot of air, which in one case, according to the height of the barometer, will vary in weight from 485 to 510 grains, in the other will vary from 490 to 515.”

Consideration of these facts will shew that changes in climate, in temperature, or in the quantity of moisture in the atmosphere, may act in the same way as impediments to free ventilation of pure air, by preventing the proper purification of the blood during respiration, and consequently derange the nutritive processes.

6. The next cause of this derangement we have to notice, is deficient or irregular muscular exercise.

The rapidity with which renovating changes take place in the living tissues, varies very

much, not only in different individuals from inherited disposition, temperament, or acquired habits, but also in the different parts of the body of the same individual. A full-sized man, with large muscles which he regularly exercises, requires a full supply of nitrogenized food to repair the waste of his muscles during their action. If he have large lungs, and live in a cold climate, he must take a full supply of carbonized food to serve as fuel in the lungs for animal combustion. On the other hand, a man of feeble power, who makes but little muscular exertion, does not wear out his tissues rapidly, and does not require much nitrogenized food for their repair. If he have small lungs, or live in a warm climate, or in a cold or temperate climate, but in warm rooms, and clothe himself warmly, he can neither require much carbonized food nor take it with impunity.

Again, the waste and repair of different parts of the body varies with the degree in which that part is exercised. When the exercise is not excessive, and food sufficient, the repair always somewhat exceeds the waste, so that the part grows and acquires strength by

use, and gradually advances towards the type of perfection. The whole body in the same way is perfected by keeping up such a balance between food and exercise, that repair and waste of the living tissues should go on with a certain rapidity, and that repair should somewhat exceed waste, especially in early life. Unless this be done the whole system remains in an inactive, sluggish condition, closely analogous to that of any particular part of the body which from the habits or occupation of the individual is left in a quiescent condition. The tissues are not composed of new, highly organized matter, in a condition of active vitality, but of old matter which has long remained in the system, which has gradually undergone more or less change, and which ought to be removed, lest undergoing further alteration it might re-enter the blood, not as mere fibrine, albumen or gelatine, more or less fit for being again circulated and deposited as nutritive substance ; but as fibrine, albumen and gelatine so altered in chemical composition as to constitute products which the blood cannot retain or circulate without grave consequences to the whole body.

7. The last of the causes of derangement in the processes of nutrition concerned in the production of gout which remains to be noticed, is want of attention to the freedom of cutaneous exhalation.

Two series of glands of the external skin pour off from the blood a considerable quantity of watery fluid, with various solid constituents. These glands are the sudoriferous and sebaceous. The fluid secreted by the former, when the body is at rest, passes off in the form of vapour, leaving behind upon the skin the solid particles it had held in solution, mixed with the excretion of the sebaceous glands. When the body is actively exercised, when the temperature of the atmosphere is high, when much warm fluid has been taken, and under certain states of disease, the watery vapour secreted by the sudoriferous glands is in such large quantity, that it stands in drops upon the surface of the body. Seguin found that the average quantity of fluid thrown off by these glands from the body, amounted on the average to 11 grains per minute, or 33 ounces in the 24 hours. This is almost entirely water, with a little carbonic acid and

nitrogen, and about a quarter of an ounce of saline and extractive matters, constituting the solid constituents which are left on the surface of the body.

The analysis of Anselmino, quoted in "*Simon's Chemistry*," gives 0.88 per cent. of solid matters, and of these solids 22 per cent. were saline. So that in 24 hours the skin exhales about 5 scruples of organic matter, 4 of saline matter, and nearly 33 ounces of water, about equalling the excretions of the kidneys in amount. Professor Faraday has shown that this organic matter is so highly nitrogenized that by merely passing the hand over the pure river sand, or pressing a piece of ignited asbestos between the fingers, ammonia is formed Dr. Golding Bird says, that he has more than once detected in it "a body resembling, if not identical with, urea, an observation confirmed by the researches of Landerer." (*Urinary Deposits*, p. 145.) Thus when the action of the skin is suspended, 5 scruples of nitrogenized substances, which ought to be poured off from the blood in the cutaneous exhalation, are retained and circulated until the kidneys fulfil the purifying function which ought to have

been performed by the skin. When the skin ceases to act, the kidneys when healthy throw off the nitrogen in the form of some lithic deposit ; if they are deranged, some other substance is formed, or the blood remains charged with excess of some compound of nitrogen.

It is difficult to determine the amount of fatty matter secreted by the sebaceous follicles. It must be very considerable, however, to fulfil its purpose of rendering the skin moist and flexible. According to Esenbeck it consists of about equal proportions of stearine, extractive and salivary matters, albumen, and earthy salts, but its composition must differ materially in different parts of the body, as the odour evolved from this secretion in the axilla, genitals, feet, and scalp, varies very greatly. Again, the epidermis continually undergoes a process of desquamation, as scales are constantly being thrown off from the surface of the true skin.

Although the amount of these scales may not be accurately determined, it is evidently very considerable, for if the hands be thoroughly washed, and kept clean by gloves, after a very short time a renewed washing will show that

a visible amount of cuticular scales has formed, and may be rubbed off.

It is evident, then, that by the three outlets afforded by the sudoriparous glands, the sebaceous follicles, and the epidermoid desquamation, the blood is cleared from a very considerable quantity of water and animal matter. This quantity varies with the temperature, degree of moisture in the atmosphere, food, and activity of other secreting organs, but in a most important degree also with the cleanliness of the skin itself. If the solid matter left by the watery vapour, as it passes off, be allowed to remain and collect on the skin, it not only impedes the exhalation of more vapour, but also interferes with the desquamation of the epidermis. Again, if the scales resulting from this desquamation be not repeatedly removed, similar impediment to exhalation results. If the secretion of the sebaceous follicles be allowed to collect, the ducts of these follicles become choked up, the secretion collects in the sac of the follicle, and causes a sort of pimple or small boil. If some parts of the surface of the body be kept perfectly clean, while other parts are left comparatively

uncleansed, the skin of the former has extra work to do, and it compensates by increased activity for the forced inaction of other portions. It cannot do this without more or less derangement, and consequently we see pimply eruptions, increased vascularity, and irregular scaly desquamation on the exposed parts of the skin, which are simply the result of over work, and which disappear when other parts of the skin are made to resume their functions.

From all this it appears, that although numbers of persons enjoy good health who scarcely ever wash the surface of the whole body, yet it is necessary for the preservation of *perfect* health, that the whole of the skin of the entire surface of the body should be perfectly cleansed at least once daily, to ensure the purification of the blood, which it is the office of the skin to effect. If this be not done, substances remain in the blood from which it ought to be freed, and give rise to derangements in the process of nutrition. In the sixth and seventh chapters, directions will be found for the use of the bath and friction in gouty persons.

It may now be well to notice briefly, some of the opinions held as to the manner in which

the chemical changes take place, which constitute the alteration in the blood observed in gout, or how the tissues of the body in process of disintegration become converted into morbid matter.

The question has been started, whether during the changes which take place while the minute blood-vessels and absorbents are depositing new and removing old matter, lithic acid is formed and carried in the blood to the kidneys, being then separated and thrown off in the urine; whether it is formed in the digested matter after leaving the stomach, or during the process of oxygenation of the new matter with the venous blood; or whether some deranged action in the kidneys forms the lithic acid from blood in which the acid did not previously exist, the whole of the acid not being excreted, but some returning by the venal veins to the general circulation, just as bile in certain states of the liver circulates and causes jaundice. This question cannot yet be considered to be completely settled, although there are grounds for believing that in most cases one of the former solutions is the correct one; that the changes of old tissue into urea or

lithic acid, takes place either in the extreme capillaries of the tissues, or that the excess of acid occurs during the process of sanguification of food.

It has been proved that in gout, not only is the formation of the lithates increased, but that the relative portions of lithic acid and urea in the urine are altered. Lehmann has shown in his *Physiological Chemistry*, that the normal proportion of lithic acid to urea is 1 to 28 or 30. After indigestion the proportion sinks to 1 in 23 or 26, and the proportion of lithic acid to the other solid constituents, which is usually as 1 to 60, sinks as low as 1 in 41 to 52, so that the lithic acid is increased not only at the expense of the urea, but also at that of the other solid constituents. He says (*Physiological Chemistry*, p. 225), "If the urea be produced from the uric acid by the partial oxidation of the latter, anything impeding the process must cause less urea and more uric acid to be secreted." Dr. Gairdner has made some experiments on this point, and has been led by them to conclude, that the lithic acid "though not derived from the urea, at least owns the same origin, and that these

substances are vicarious of each other." He adds, that "a less perfect consumption of carbon, or elimination of carbonic acid by the lungs, would give us uric acid in the blood," and thinks that this shows how repose and indolence aid the production, while exercise and pure air prevent it.

Liebig has offered an explanation of these disordered processes, and according to his commentators, his views lead to the inference, that gout is "an inflammation in parts in which the usual changes which the oxygen effects are unable to take place, in consequence of an excess of the non-nitrogenous principles in the body." (Bence Jones, page 61.) According to these views of Liebig, the acids formed in a state of health from the amylaceous, saccharine and mucilaginous components of non-nitrogenized food, are converted into carbonic acid and water by combining with oxygen. When any circumstances prevent or diminish the supply or action of oxygen, the changes are more or less retarded, and the lactic and acetic acids remaining in the blood must be thrown off from it. This is the derangement of the first stage of assimilation. Then during

the metamorphosis of tissue, oxygen being conveyed to the worn-out tissues, combines with their elements, and forms products of which lithic acid is the principal. A further supply of oxygen and water converts the insoluble lithic acid into soluble urea and carbonic acid, so that the disintegrated tissues have their elements so arranged as to reach the excreting organs in a soluble form. This conversion of lithic acid into urea is only complete when the supply of oxygen is sufficient, and in this way non-nitrogenized food, by monopolizing a great proportion of oxygen to secure assimilation, and prevent development of lactic and acetic acid, prevents the conversion of lithic acid into urea, and the former remains in the blood in a greater or less proportion, and appears in the urine. All other causes which diminish the supply of oxygen act in the same way.

Dr. Gairdner, as we have just seen in his recent work on gout, supports these views, which, though very ingenious, unfortunately for the theory, are completely contradicted by observation at the bed-side. According to them a vegetable, carbonized, or non-nitrogenous diet, should increase the formation of

lithic acid; while an animal, or nitrogenous diet, should diminish it. Yet observation proves that the very opposite of this is the case. Other things being equal, an animal diet increases, and a vegetable diet diminishes, the formation of lithic acid. Magendie found that lithic acid disappeared from the urine of carnivorous animals on restricting them to a vegetable diet. It is not present in the urine of herbiverous animals, and it was difficult to procure the converse of Magendie's experiment by making herbiverous animals take animal food. They will not do so. Lately, however, M. Bernard thought of the ingenious, though cruel plan, of subjecting them to a prolonged fast. In this way they nourish themselves; they are fed by the absorption of their own tissues, and thus become for a time carnivorous animals. Then lithic acid appears in the urine. Dr. Lehmann, of Leipzig, proved, by ascertaining the quantity of urea and lithic acid excreted by himself in twenty-four hours, under four different systems of diet, namely, exclusively animal, mixed animal and vegetable, exclusively vegetable, and of food containing no nitrogen whatever, that a vegetable

and non-nitrogenous diet diminishes, and an animal or nitrogenous increases, the quantity both of urea and lithic acid. More recent experiments, performed on ducks, by Boussingault, to show the quantity of acid excreted after the ingestion of various articles of food, confirm this view.

These facts are sufficient to prove that Liebig's theory is unsound, and that practice founded upon it must be erroneous, and is likely to be dangerous. Some chemists also assert that his numerical results are incorrect, and the tendency of the most recent researches is to establish the truths of the doctrine long since advanced by Dr. Prout, that urea and lithic acid are formed from the nitrogenized elements of disintegrated tissues, and from the nitrogenized food which, being in excess, is imperfectly assimilated by the digestive organs. It is also extremely probable, though not absolutely established, that lithic acid is the special product of the disintegrated albuminous tissues, and urea of the gelatinous. This explanation is in perfect accordance with the results of practical observation, and proves the necessity of diminishing the supply of nitrogenized food,

when the formation of lithic acid in excess shows that the blood is receiving an inordinate supply of nitrogenized elements, either from the lacteals of the digestive organs, or from the lymphatics which return the products resulting from the disintegration of tissue.

It does not follow because the most marked chemical changes recognised in the blood and excretions in gouty persons are those connected with undue development of lithic acid, that this development is the only change which really takes place, or is the sole result of the operation of the various causes which derange the processes of nutrition. On the contrary, it is difficult to conceive that such causes can operate, for any length of time, without affecting every organ in the body. Whatever may have been the first departure from a state of health, so soon as the organs of secretion and excretion are supplied with impure blood their functions must be deranged. The kidneys have to excrete superfluous nitrogen, they do it for a time, then become incapable of doing it completely, and other organs are called upon to compensate or assist in its elimination, with more or less disturbance of their own proper functions. The liver receives superfluous car-

bon in the food, and must excrete it ; or the elimination of carbon by the lungs being interfered with, the liver must compensate for deficient pulmonary exhalations. It does so for a time, then becomes deranged, and the kidneys are called upon to do what the lungs or liver ought to have done. They throw off large quantities of carbon in the colouring matter of the urine, or in the form of hippuric acid, but they cannot do this without derangement of their own proper functions. In the same way, when the excretion of nitrogen by the skin is more or less suspended, the kidneys must compensate for the deficient cutaneous elimination. They do so, but suffer for it. Thus, whatever may be the primary cause, the general effect in the end is the same—an impure state of the blood is produced by the imperfect performance of some of the various processes of nutrition ; the most marked, and only distinct impurity hitherto recognised, being an undue accumulation of certain compounds rich in nitrogen.

The only nitrogenized substances hitherto known to have been detected, are urea and lithic acid, or its compounds ; but I am convinced, from observation, that these are by no

means the only forms in which nitrogen may be found in excess; for I have observed, in two cases, that when a few drops of the serum of the blood were allowed to evaporate on a piece of glass, and were examined under the microscope, that yellowish crystals, neither resembling the ordinary salts of the serum nor the lithates, were observed. In one of these cases I was able to obtain about six ounces of blood, in 1849, and my friend, Dr. Meyer, examined it. He informed me that on treating the serum with alcohol and chloride of zinc, he obtained a precipitate which partly dissolved in boiling water, and left, on evaporation, crystals of a highly nitrogenized substance, which I have since been convinced must have been kreatine or kreatinine. I could detect no similar matter in the urine in that case. It was low in specific gravity, varying only from 1010 to 1015, but otherwise normal.

I have also found that, in some gouty patients, who suffer habitually from hepatic derangement and hemorrhoids, that carbonized substances abound in the blood, and may be detected in the urine, in the form of hippuric acid, or hippurate of ammonia.

## CHAPTER II.

## GOUT AS MODIFIED BY RHEUMATISM.

Characters common both to gout and rheumatism—Those in which the two diseases differ—How the two may be combined—Rheumatic gout—Acute rheumatism developed during an attack of acute gout—Acute rheumatism in persons affected with chronic gout—Acute gout complicating chronic rheumatism—Synovial rheumatism—Rheumatic neuralgia.

Gout and rheumatism are similar diseases, inasmuch as the most prominent early symptoms in acute cases of both diseases depend upon a peculiar or specific form of inflammation of the fibrous tissues. In certain forms of chronic rheumatism also, without much constitutional disturbance, the symptoms sufficiently resemble those of gout to deceive many persons. But in the essential elements of the diseases—the changes in the blood—in the

consequent morbid alterations in the tissues, in the character and progress of the symptoms, and in the effects of remedies, gout and rheumatism differ very widely.

*The blood* in rheumatism very often does not contain more lithic acid than healthy blood. This fact has been established by the researches of Dr. Garrod, and by his analysis of the blood of patients suffering from rheumatism, and affords the most remarkable contrast to the state of the blood in gout. It has not yet been determined how changes take place in the blood in rheumatism, but the doctrine of Dr. Prout is that which is best supported by evidence. He regards them as produced by, and depending on, an undue development of lactic acid, during disintegration of the gelatinous tissues. Increased proportion of fibrine and solids of the serum, with diminution of globules and water, has been generally recognized, but the chemical alterations of the saline constituents have not been determined. According to Dr. Bence Jones (page 61) Liebig's researches lead to the inference that the blood changes are the same as in gout, and that while in gout they are the effect of excess of non-nitrogenous

principles in the body, in rheumatism, or "the universal gout," they seem to arise from the action of cold on the skin. We have seen how erroneous the first part of this proposition must be. The second is not less so, for the lithic acid in excess, in the one disease, is absent in the other. This has not only been proved by analysis of the blood in Dr. Garrod's cases, but by examination of the excretions poured forth from it in many others.

Recent investigation appears to be leading to the following conclusions:—1. That when urea is formed in the blood in undue proportion, or is not duly excreted by the kidneys, dropsical effusions take place in various parts of the body. 2. That when lithic acid is, from any cause, accumulated in the blood, the effects are gout, calculous disorders, or both gout and calculus. 3. That when lactic acid is formed in excess, by derangements of the first or second stages of the processes of nutritive assimilation, and its elimination from the body is checked, the result is rheumatism. The truth of the latter conclusion is not yet fully established, but examination of the urine and perspiration in rheumatism strongly supports it.

*The morbid alterations in the tissues* differ essentially in cases of gout and rheumatism, as the tendency to saline or calcareous deposit in the fibrous tissues, which is the most evident alteration in gout, is not observed in rheumatism. This is the great distinction.

The *secondary differences* are neither few nor unimportant. The liability to pericarditis, the most serious character of acute rheumatism, is scarcely ever observed in gout. In rheumatism profuse acid perspirations are almost universal ; in gout the skin is dry. The first attack of gout is generally limited to particular joints of the feet. In rheumatism the first attack is most frequently general and acute. Edema of the affected parts is common in gout, rare in rheumatism. Gout commonly affects the small joints, rheumatism the larger ones. In gout the alternations from severe pain to perfect health are often rapid ; in rheumatism convalescence is more gradual. Again, the poor suffer more than the rich from rheumatism ; the opposite is the case with regard to gout. Gout is common in states of the system produced by over nutrition ; rheumatism is most common under the opposite conditions.

Rheumatism is often clearly traced to the simple action of cold or wet, in checking perspiration in healthy persons. Healthy persons do not suffer from gout from any such cause, although those subject to gout often have an attack so brought on. Gout is very rare in warm climates, while rheumatism is common. The returns of the sickness of our army and navy prove that rheumatism is more common in the Mediterranean than in Canada. Lastly, with regard to the effects of remedies, the action of colchicum, which is so marked and powerful in gout, is almost null in cases of unmixed rheumatism.

There are several classes of cases, however, in which the symptoms of rheumatism and gout may be simultaneously observed in the same person, constituting varieties of what is called RHEUMATIC GOUT, a most indefinite term, embracing several distinct species of compound disease. Those most commonly observed in practice may be shortly described under the following heads:—

1. *Acute rheumatism developed during an attack of acute gout.* A gentleman, about 40 years of age, descended from gouty parents,

and accustomed to indulge rather freely in the pleasures of the table, about five years ago had a slight attack of gout under the ball of the right great toe. This soon went off, but at intervals of three or four months similar attacks had recurred, their severity and frequency both being on the increase. One evening he felt that an attack was threatened, but he attended late in the House of Commons, and, as the pain was increasing, he thought a day's exercise would probably ward off the attack, as he had found it do so before. Accordingly, on leaving the house, he posted all night between seventy and eighty miles, to have a day with his hounds. He arrived but just in time to equip for the field, and had one or two short runs and a very long one, in the midst of rain, on a cold day. He had to ride fifteen miles on a tired horse, on returning, and when he reached home had to be lifted from the saddle and carried to bed. He took hot brandy and water, but a severe rigor came on, and a general attack of acute rheumatism set in on the following day. It was so severe that the gouty inflammation of the foot was disregarded, attention being given to the state of the heart

and general condition. In about a fortnight he was convalescent, so far as the rheumatism was concerned, but the gouty action continued in the foot, and did not disappear until a few doses of colchicum had been given.

This case is one of a numerous class. The disease is often miscalled rheumatism or gout, and the mistake has been frequently committed in consequence of attributing virtues to bleeding and antiphlogistic treatment in gout on the one hand, and to colchicum in rheumatism on the other, to which neither are entitled.

2. *Acute rheumatism in persons affected with chronic gout.* This is a less frequent form of disease than the last. Persons affected with chronic gout are more careful of their health, and are not so often exposed to the causes of acute rheumatism as others. Still, such a case as the following is not unfrequently met with. A gentleman affected with chronic gout, having considerable deposits of the lithates in the fingers and around the ankles, and being subject to copious urinary deposits of varying composition, passed some time in Malta to obtain the advantages expected from living in a

warm climate. After a very hot day he remained in a boat in the harbour fishing for some hours, on a moonlight evening. He had been perspiring freely in the afternoon and was lightly dressed. He felt rather chilly before he went home, had a severe shivering fit in the night, and was confined to his bed for twelve days with a smart attack of acute rheumatism, affecting the knees, shoulders, and loins, but not any of the joints which had previously been affected by gout.

*3. Acute gout in persons affected with chronic rheumatism.* It occasionally happens that a person, who in early life has suffered from rheumatism, and at certain seasons, or under certain states of the weather, still suffers from pain and stiffness of some of the joints, or in the loins, or from rheumatic sciatica, as he advances in life become less active than formerly, and has a keener perception of the beauties of gastronomic art. The effect is not to cure the rheumatism, but to produce gout. The anatomical changes in the tissues rheumatism has produced remain unaltered, while the blood becomes charged with an excess of nitrogenous principles. A slight attack of gout

comes on, and may easily be mistaken, both by patient and attendant, for one of the old visitors. It may go off and recur, just as gout does in persons unaffected by rheumatism. The old rheumatic symptoms may also, from time to time be, troublesome. Both require special attention and treatment, and thus they constitute what is perhaps as common as any variety of rheumatic gout, a fourth species, or *chronic gout with chronic rheumatism*.

4. *Synovial rheumatism, or rheumatic synovitis*, is not rheumatic gout, but it is so often mistaken for it, and so many persons, when they speak of rheumatic gout, simply mean rheumatic synovitis, that it is necessary shortly to describe this kind of case as most commonly met with, and show how it differs from gout.

Synovial membranes, whether articular, lining bursal cavities, or the sheaths of tendons, are all subject to attacks of rheumatic inflammation, both acute and chronic. Acute rheumatic synovitis of a large joint is not likely to be mistaken for gout, as the swelling is so much greater, occurs so much more rapidly, and so evidently assumes the shape of distended synovial membrane, modified by the

direction of the harder tissues forming the joint affected, that no difficulty can be met with in arriving at a correct diagnosis. There is also in rheumatic synovitis a great tendency to cerebral complication, and to a peculiar form of iritis. When acute gout does affect a large joint the swelling takes more of the general form of the joint, the synovial membrane is not particularly distended, no fluctuation is evident, there is more oedema, and the swelling is clearly more from cellular than synovial effusion. The constitutional symptoms are those rather of gout than of acute rheumatism, whereas, at the commencement of an attack of rheumatic synovitis, they resemble those of acute rheumatism. In this form of synovitis, however, they soon subside, and the complaint becomes chronic and local, or some other joint is affected. In the chronic form it is only by the history of the case that rheumatic synovitis can be distinguished from the effects of gouty deposit upon the surface of the synovial membrane, in the sub-synovial cellular tissue, or in the substance of the cartilages. In either case the bursæ and sheaths of tendons are often simultaneously affected.

There is another form of disease, which is termed by some rheumatic gout, and I have heard it called synovial gout. Pain, swelling, and stiffness of some of the larger joints, come on without any evident cause, in persons taking little exercise, and living temperate but luxurious lives, nearly as often in the female as the male, attacking the knees more frequently in the female, the fingers, wrists, and elbows, in the male. There is not the acute pain of gout, none of the fever of rheumatism, but there is a chronic thickening all around this joint, which persists long after pain has subsided and stiffness has nearly disappeared. The whole joint appears to be enlarged, although it is clear that there is not much fluid effused either within or around it, and the irregular chalky deposits of gout are wanting. This condition has been described by Sir Benjamin Brodie with his usual accuracy. He attributes it to thickening of the synovial membrane. There is a preparation in the Museum of the College of Surgeons, which may probably be considered as a specimen of the morbid anatomy of this variety of disease in its most aggravated form. The patient had

been subject to gout for many years, but there was no gouty deposit in the joint preserved. It was distended with lymph, coagulated blood, and synovia, supposed to have arisen from recent injury. The synovial membrane is thickened. Flakes of recently formed lymph adhere to it. Other masses of well organized lymph form small pedunculated growths from the surface of the membrane. The cartilages are absent, and the articular surfaces of the bones are beset by nodules of hard new bone. In the same museum are several preparations illustrating similar diseases in other joints.

The order of diseased action in these cases appears to be, first, the general disorder of the system setting up synovitis. Then the sub-synovial cellular tissue becomes affected, the cartilage is gradually absorbed, while new bony matter is deposited. The ligaments being kept on the stretch by the fluid within the joint, a remarkable degree of distension is often produced. The fingers, particularly, will appear as if dislocated, and all this without the chalky deposit of simple gout.

5. *Rheumatic sciatica* occasionally attacks a patient subject to chronic gout, and it becomes

extremely difficult to distinguish this case from the very painful form of sciatic neuralgia, which is occasionally produced by gouty deposit in the sheaths of the lumbar or sciatic nerves.

In any case of sciatica, the pain follows the course of the sciatic nerve from the branches of the sacral plexus which compose it, out of the pelvis, down the back of the thigh, and then along the course of its continuation, the posterior tibial nerve to the leg and foot. It may be either dull, benumbing and continuous, or spasmoidic, violent, and intermitting. In some cases it is increased by cold, in others by warmth, in almost all by motion.

This obstinate and painful affection may not depend either upon rheumatism or gout, but may be purely sympathetic of renal derangement, or accumulations of faecal matter in the cœcum or colon. It may also be simulated by disease of the hip joint. A correct examination of the joint will, of course, at once establish the diagnosis in the latter case. Renal derangement will be induced by urinary deposits, by the pain not following the exact course of the sciatic nerve, but extending also down the

inside of the thigh and groin, and upwards along the course of the ureters, the testicles also often being painful or retracted. Pressure on the sacral plexus by accumulation in the colon, may be suspected when the right leg is principally affected, and the signs of gastro-enteric derangement are present—foul tongue, flatulence or colic—and the fact is established by pressure and percussion of the abdomen.

True sciatica may depend upon rheumatism, gout, or syphilis. In either case a certain amount of effusion or deposit appears to take place in or upon the sheath of the nerve. The local symptoms are very similar, but the constitutional symptoms of the original disease will be present, and lead to a correct diagnosis and treatment, in either case the iodide of potassium being the most valuable remedy.

The cases in which we are led to believe, from the presence of gouty deposits in other parts, and the occurrence of sciatica, that the sheath of the sciatic nerve is also affected, vary considerably in complexion. There may be much or little constitutional derangement at the time, much or little fever. The pain may be acute and transient, or dull and continuous.

The muscles may be knotted by cramp, or benumbed and partially paralysed. But in all cases the loss of power is greater than the pain could account for. The limb feels swollen and heavy. It cannot be moved freely, not so much because the motion causes pain, as from the feeling of weakness. The function of the nerve appears to be impaired by the compression of its own sheath.

In those cases nothing can be expected to afford permanent relief which does not cause solution and absorption of the deposit. When after the first inflammation has subsided, or has been subdued by cupping or blister, the signs of effusion persist, acupuncture of the nerve itself sometimes affords immediate and lasting relief; it also proves useful in some cases, where both solid deposit and liquid effusion appear to coexist. Indeed, in the absence of pathological observation, it is to the sensation communicated by the acupuncturating needle, that we are led to infer the existence of deposit in the neurilema. The brachial and facial nerves are sometimes the seat of a similar affection.

## CHAPTER III.

## GOUT AS MODIFIED BY SYPHILIS.

Laws of syphilis—Alterations it produces in the blood modifying other diseases—Syphilitic purpura complicating chronic gout—Syphilitic cutaneous eruptions in gouty persons—Syphilitic synovitis and periostitis complicating chronic gout—Syphilitic onychia with gouty deposits on the fingers—Syphilitic ophthalmia in gouty patients—General debility, *tedium vitæ*, and rapid decay occurring about middle age in gouty patients as a consequence of syphilis—Treatment of these complications by iodide of potassium.

THE varieties of syphilitic disease, primary, secondary, and tertiary, have occupied the attention of numerous observers, and have been very accurately described in many British and foreign works. Comparatively little thought, however, has been expended upon the modifications of the processes of nutrition, either in health or disease, which may be traced in many cases for years after all ordinary symp-

toms of the action of the syphilitic poison have ceased. We hear a great deal of syphilitic iritis, syphilitic eruptions on the skin, and syphilitic diseases of the bones commencing months and years after inoculation of the poison. Not unfrequently some irregular sort of cases are called syphilitic rheumatism, gonorrhœal rheumatism, or gonorrhœal synovitis, and more rarely we hear of some instance of metastasis of gonorrhœa to the brain or spinal chord. General debility, loss of power in the digestive organs, and in the whole system, emaciation and hypochondriasis, are often set down as "syphilitic cachexia," or more frequently as "mercurial cachexia;" but there is a condition dependent upon some profound alterations in the blood, effected by the syphilitic poison, which has been often observed by myself and others, but which is seldom traced to its true origin. I know of no author who has pointed out how this condition may modify other diseases.

Syphilis had made its appearance, and had been observed for nearly a century before the dependence of its secondary upon its primary symptoms was discovered. The ulceration of

the throat, the cutaneous eruptions, the diseases of the fibrous tissues and bones, were all supposed to be distinct and separate diseases, until their dependence upon the primary sore was established by observation. Even Hunter doubted whether the form of iritis, now universally recognized as syphilitic, really were so ; and there are, at the present day, some points in the pathology of the disease which, though established by facts, are far from being generally acknowledged.

It is quite clear that the syphilitic virus is as much a *poison*, as the virus of small-pox or cow-pox. It has been preserved in tubes by Ricord, just as vaccine lymph is preserved, and at the end of seventy-three days has produced syphilitic disease, after inoculation. Small-pox and cow-pox, like some other diseases, so affect the blood of those in whom they operate that, as a general rule, such persons, after recovery, are not susceptible to any further action of the same poison—they are not liable to a second attack of the same disease. But no operation of the poison of syphilis, however severe, has any such effect. Primary symptoms already existing, do not preserve from the pro-

duction of other primary symptoms, nor do secondary affections offer any impediment to the contraction of primary.

It has been also proved that *two* poisons are in operation in venereal affections—that the poison of syphilis causes chancre, and the poison of gonorrhœa causes gonorrhœa, just as certainly as the poison of small-pox causes small-pox, and that of vaccinia the cow-pox. The two venereal poisons produce their peculiar effects upon the whole system, as well as upon the parts to which they are directly applied.

The doctrine is also well established by fact, that the poison, however applied, and by whatever tissue absorbed, is taken into the blood, and that both primary and secondary symptoms are merely evidences or indications of the contamination or poisoning of the blood. After vaccination cow-pox runs its course, although cauterization or the cupping-glass be used to prevent absorption. Just in the same way cauterization and excision of chancres have proved perfectly useless in preventing constitutional contamination, however useful they may have been in curing the primary sore.

It is clear that the poison of syphilis must be absorbed into and mingled with the blood. How long it remains there, or what alterations it undergoes, what affinities it has for certain tissues, how it produces so long a train of diseased actions, or how it is destroyed or removed from the body, we know not. As yet these are mysteries. Observation, however, has enabled us to determine some of the laws which regulate the operation of the poison.

The period during which the poison remains in the blood before its primary effect is produced, varies from a few hours to six or seven weeks. The period which elapses from the cure of the primary until the occurrence of the secondary symptoms, varies from three or four weeks to many years. Dr. Williams saw a case (*Morbid Poisons*, vol. ii. page 72) in which syphilitic psoriasis and periostitis appeared in 1831, the effects of primary symptoms cured in 1815. Dr. Williams says, "It is morally certain that no second infection took place in this case, so that fifteen years must have elapsed between the subsidence of the primary and the occurrence of the secondary symptoms." Mr. Abernethy also records

a case in which the period of latency was of similar length. It follows, therefore, that, although many cases of syphilis may run their course in a few days or weeks, still there are others in which months and years elapse between each successive attack, so that a great part of life may pass away before the effects of the poison are entirely exhausted." (*Loc. cit.*)

In order to explain fully how gout and any other disease must be modified by syphilitic contamination of the body, it is necessary to enter into a little further detail upon the alteration of the blood as proved by the manner in which infection may take place. The foetus in utero may be infected with *secondary* syphilis. In the Foundling Hospital of Paris the proportion of children born with and without syphilis is 17 to 1000. In many cases children are infected at the time of birth, the mother labouring under primary symptoms at the time ; but in other instances such a mode of infection is impossible. In one case recorded by Bertin (*Traité de la Maladie Vénérienne*, p. 514), a pregnant female, suffering from secondary syphilis, died suddenly from accident. The foetus in her uterus was found

to be affected with syphilitic disease of the bones, and with other secondary symptoms. It is also often observed that diseased children cannot have been infected by direct contact, because the mother was perfectly free from primary symptoms, and in other cases secondary symptoms are evident in the child at the moment of birth.

It is thus proved that secondary symptoms may be transmitted from the parent to the child. It has also been proved that they may be transmitted, not only when one or both parents are affected with primary symptoms, but also long after primary symptoms have disappeared, one or both parents being affected, perhaps not knowing it, with secondary symptoms. It is easy to understand how the foetus is infected when the mother is diseased, but the fact that the existence of secondary syphilis in the male parent may give rise to the disease in the foetus while the mother remains healthy, shows that the poison must either be carried in the seminal fluid directly to the ovum at the time of impregnation, or be taken into the blood of the mother and circulated to the ovum, where its effects are alone manifested.

Whichever of these suppositions may prove correct, the fact cannot be denied, that children are frequently born with unmistakable symptoms of syphilis while the mother has not had the least sign of the disease, and when the father, also, has been for a long time free from any evidence of its existence. Such children are generally born prematurely, often dead and putrid, while some are born apparently healthy, and the syphilitic symptoms do not show themselves for weeks or months.

As the male parent, suffering from latent syphilis, may infect his unborn offspring, it is not surprising that he should infect the female parent. No doubt can be entertained, with justice, that this is the case, for numerous cases are recorded in which secondary symptoms have been produced in the female years after primary symptoms have disappeared in the male, and when all secondary symptoms have also, apparently but not really, ceased. Mr. Colles has proved that a married man, perfectly free from every appearance of syphilis, shall yet infect his wife in such a manner that secondary symptoms shall appear in her, not being preceded by any primary symptom, or

by any discharge whatsoever from the genitals. (*Pract. Obs. on the Venereal Disease*, p. 263.) Mr. Colles has also proved that a child suffering from secondary symptoms may infect a sound nurse; and that a nurse suffering from secondary symptoms may infect a sound child, provided the nipple be ulcerated.

All this has been brought forward to show that the poison of syphilis must effect some profound alteration in the blood, which may persist for years, and give rise to specific diseased actions not only in the person originally poisoned, but that the secretions of this person contain poisonous matter, and may give rise to the same specific disease when absorbed into the blood of another person. In pregnant females this absorption affects not only the female herself, but her unborn infant also. In this manner repeated abortions are caused about the seventh or eighth month of pregnancy. The child is born dead, badly nourished, the nails unformed, the cuticle peeling off easily, and yet neither father nor mother may be suffering at the time from secondary symptoms. These symptoms, however, do show themselves sooner or later, and point out the

cause of abortion, with the simple means of presenting subsequent misfortunes, by curing the syphilitic disease.

It is evident that a condition of the blood and secretions which is sufficiently removed from a condition of health to be transmissible from one person to another, must be capable of modifying other diseases which essentially consist in alterations of the blood and secretions. Gout is one of these diseases, and I now propose to describe some of the forms in which the complication of gout, with secondary and tertiary syphilis, is met with in practice; premising, that as the subject is a new one, my observations can only be regarded as a very imperfect sketch of a most important subject hitherto neglected. The late Dr. Williams, of St. Thomas's Hospital, I believe, was the only medical man who had attended to this complication of disease, and he has not published the results of his experience. It was by his remarks, however, that my attention was first directed to it.

I do not intend to allude here to the primary syphilitic affections to which a gouty person may expose himself and from which he

may suffer. My observations are entirely restricted to those secondary affections which persist, often unsuspected, long after antecedent symptoms have disappeared, and are intended, first, to point out how various forms of secondary syphilis may show themselves in gouty patients, and be mistaken for the effects of gout; secondly, to describe a condition of the whole system, which sometimes materially modifies the symptoms of gout and the effects of remedies, this condition being an effect of latent syphilis.

1. *Syphilitic purpura complicating chronic gout.*—One of the first cases in which I saw a complication of gout and syphilis was in a brewer, who was suffering from chronic gout. He had chalky deposits about the fingers, with thickening around the ankles. At times he suffered from an acute attack of gouty inflammation in these parts. He was in a state of plethora, was over fed, drank large quantities of beer, and took little exercise. One morning, on getting up, he found his legs covered with minute blue spots, which soon extended to the trunk, and, after a day or two, appeared on the arms. They gradually increased in size,

and some of them became confluent, forming irregular blue patches on the skin. The disease was clearly purpura, one of the last disorders we would have expected to see in a person of the condition of this patient. On careful inquiry it became evident that we had to deal with the syphilitic form of purpura. Primary symptoms had existed six years before, which had been followed within a year by slight ulceration of the throat, but no other secondary symptom had appeared during the intervening five years. The purpura soon disappeared under the use of iodide of potassium, but the general condition of the patient was much altered. He had formerly been a stout, ruddy, corpulent person, and his urine had deposited lithic acid or the lithates copiously; but after this he lost flesh, became sallow in appearance, his urine contained albumen for some time, and afterwards phosphates. It is ten years since I have seen him, and I have been unable to discover if he is alive or not.

2. *Syphilitic cutaneous eruptions in gouty persons* may be occasionally seen under the forms of lichen, prurigo, lepra, psoriasis, and roseola, which are considered and treated as

gouty affections, but which, on careful examination and inquiry, and especially by observing the effects of treatment, may be clearly traced to syphilitic contamination. When syphilitic maculæ appear on the skin no one would be likely to mistake them, but other forms of eruption are less peculiar. There is nothing, for instance, in syphilitic roseola or lichen by which, in their early stages, these eruptions can be distinguished from other forms of roseola or lichen. The brownish or copper-coloured spot persisting after subsidence of the pimple or blush is probably the first appearance which gives rise to careful inquiry into the history of the case. So with lepra and psoriasis, the syphilitic forms of the disease are perfectly well known and easily recognised, but it is often a long time after the occurrence of the eruption before the distinguishing characters of the syphilitic variety become evident. I have even seen them obscured by the presence of saline efflorescence, which was considered to be a certain sign that the cutaneous affection was—purely gouty. There is absolutely nothing in the syphilitic form of purpura by which it can be distinguished by the eye as

different from other varieties of purpura. It is only the occurrence of the disease in persons in whom its appearance cannot be otherwise explained, which excites attention and inquiry.

3. *Syphilitic synovitis and periostitis complicating chronic gout.*—A form of gonorrhœal synovitis of the larger joints in which the ligaments are also affected, and the tendency to iritis is strongly marked, very much resembles the disease described in the last chapter as synovial rheumatism, and is often called rheumatic gout. It is not by any peculiarity of local symptom, but only by careful inquiry into the whole history of the case and consideration of other preceding or accompanying general and local symptoms, that the truth can be discovered. Gonorrhœa, synovitis, and iritis, is the usual order and succession of the symptoms.

Other cases in which syphilis and gout not unfrequently coexist resemble the following one. A gentleman who had suffered from several attacks of gout in one foot, was suddenly attacked with inflammation of the knee joint on the same side. This resisted ordinary

methods of treatment. He was also affected for the first time in one elbow joint, and in some of the joints of the fingers in both hands. The case was treated for some time without effect as gout or rheumatic gout. When I was first consulted, the gentleman was suffering from a peculiar superficial headache, particularly felt where the rim of the hat presses, a symptom I have often noticed in cases of secondary syphilis, apparently produced by periostitis on the frontal bone. It led me therefore to make careful inquiry into the history of the case, when I found that primary symptoms had been observed two years before, and that syphilitic ulceration of the throat had followed after an interval of six months. All the syphilitic symptoms readily yielded to the iodide of potassium.

Syphilitic periostitis of the lower third of the tibia may exist with gouty concretions about the ankle joint, and be mistaken for extension of gouty disease. The character of the pain, its nocturnal exacerbation, and its persistence after all other acute symptoms of gout have disappeared, will lead to correction of the error. I have seen syphilitic caries of

the os calcis with thickening of the tendo-achillis allowed to proceed unchecked, and produce permanent injury to the ankle joint, the patient having been treated for gout, until portions of the bone exfoliated. I have also seen a case of syphilitic inflammation of the periosteum of the ribs and pericardium of the costal cartilages, called "gout in the chest." Here the mistake was inexcusable, as there were syphilitic maculæ on the chest and arms. The patient was a martyr to gout, but the extreme tenderness on pressure and absence of spasm, might at once have led to a correct diagnosis.

4. *Syphilitic onychia, with gouty deposits on the fingers.*—Very recently I saw a case in which chalk stones formed around the finger joints of a gentleman, and were supposed to be the cause of disease beneath the nails. This part of the affection, however, was evidently syphilitic psoriasis attacking the roots of the nails and extremities of the fingers.

5. *Syphilitic ophthalmia in gouty patients.*—When ophthalmia occurs in a person subject to gout, in whom syphilis is not suspected, very serious mistakes in treatment may be com-

mitted, and are more likely to do so, as in both cases the two eyes are very often simultaneously affected, the symmetry of the morbid action equally pointing to the constitutional origin of the local disease.

As the means of distinguishing between gouty and syphilitic diseases of the eye may be found in the works of Mackenzie, Lawrence, Morgan, Tyrrell, and other practical writers, it is only necessary here to notice the liability to error and the necessity for examining closely any attack of ophthalmia in a gouty person. It is very unsafe to conclude that, as a person is subject to gout, therefore his inflamed eye suffers from his ordinary disease.

Some further remarks on the pathology of the gouty forms of ophthalmia, will be found in the succeeding chapter.

6. *General debility, tedium vitæ, and rapid decay, occurring about middle age in gouty patients as a consequence of syphilis.*—It is by no means rare for a person between forty-five and sixty-five years of age, who has enjoyed good health, even great strength and vigour, with the exception of occasional gouty attacks, which have probably on subsiding left him apparently better

than before, suddenly and without any evident cause to become restless, irritable, and feverish. He is easily exhausted by slight exertion, and loses flesh. The appetite becomes irregular. He is sometimes voracious, at other times there is absolute indifference to food. Sleeplessness, headache, a white tongue, and a pulse permanently raised above the natural standard, are the points most prominently brought before the notice of the medical attendant. The headache is peculiar. It is superficial, and often accompanied by tenderness of the scalp. There are wandering pains in the chest and shoulders, which when violent also affect the back and limbs. Some eruption on the skin of the forehead, or backs of the hands is probably observed. There is great mental depression, perversion of the natural affections, loathing of life, and sometimes irrepressible tendency to suicide. When the gouty attack recurs the patient is for a time relieved. His mind is occupied by the return of more familiar sufferings, but he soon complains that the gout is of a "bad sort." It is less violent, but remains longer, is not followed as before by relief, but by still greater general depression

and emaciation. Such a condition may sometimes arise from natural causes, diminishing the vital powers, such as sorrow or anxiety, a late marriage, or some organic disease, as gouty deposit in the membranes of the brain, but I believe it to be more frequently the effect of syphilitic poison which has laid latent for a long time in the system without producing any of its more commonly recognized secondary symptoms, for some chronic periostitis may generally be discovered, some fixed and deep-seated pain in one of the large joints, and sometimes some less equivocal sign of syphilis may be observed.

In other cases a distinct form of hectic fever is set up. A patient who has been going on well after one of his ordinary attacks of gout, suddenly begins to lose flesh, colour, and appetite. The face assumes a waxy, pallid hue. There is continual thirst, a quick pulse, and sleeplessness, with night sweats so profuse that the night shirt has to be changed two or three times in the night. There may be no external evidence of venereal disease, but more often there is. In either case the general health is completely broken up. The strength is gone.

There is some swelling in the cervical glands and rapidly increasing emaciation. Sometimes this state is relieved when some local development of the action of the syphilitic poison becomes manifest. The general condition improves when a cutaneous eruption, or even severe periostitis is set up. Sometimes the febrile condition only ceases with life, or cough comes on, and the case is set down as one of rapid consumption, or, as it is called by some, "syphilitic phthisis." It is not phthisis, as no tubercle is deposited in the lungs, but a syphilitic ulceration of the mucous membrane of the air passages.

7. Sauvages and Cullen have admitted into their nosological systems what they call *phthisis syphilitica*, and succeeding writers have alluded to forms of pulmonary disease produced by the action of the syphilitic poison resembling, in many respects, tubercular phthisis. It is to Drs. Graves and Stokes, of Dublin, however, that the profession is indebted for the first clear and distinct account of the forms of pulmonary disease produced by syphilis. These distinguished physicians have shown that both acute and chronic bronchitis, with syphilitic

hectic, and periostitis of the ribs and costal cartilages, are often dependent upon the action of the poison of syphilis on the bronchial mucous membrane, just as the same membrane is often affected by the poison of different varieties of exanthematous fevers. Bronchitis is followed by a brownish-red cutaneous eruption, analogous to the action on the skin of measles or scarlatina. The eruption on the skin relieves the fever and bronchial irritation, while repressed eruption produces or renews this irritation. Dr. Byrne, of the Lock Hospital, informed Dr. Stokes (*Diseases of the Chest*, page 93), that he had often seen, in that hospital, intense bronchitis and fever, when relieved by bleeding, followed by copious lichenous or squamous eruption. Respiration became perfectly pure as soon as the cutaneous eruption appeared, severe bronchitis appearing on repression of the eruption. The period at which this disease may arise after contamination, or after the cure of preceding affections, varies from a few weeks to several years.

In the *Medical Gazette* for 1841, Dr. Munk has furnished us with an account of the morbid anatomy of this disease. The most impor-

tant morbid appearances consist of numerous minute ulcerations on the mucous membrane of the larynx, trachea, and bronchial tubes. Dr. Munk has also shown that pneumonia may arise from the same cause, and has supposed that pneumonic abscess, so rare in simple pneumonia, is common in the syphilitic variety. More recently, M. Ricord has shown that when syphilitic tubercles are forming in the cellular tissue similar deposits take place in the lungs. In a lecture lately published in the *Lancet* he warns his pupils not to confound the suppuration of a few syphilitic tubercles in the lungs with phthisis. Dr. M'Carthy dissected one of these cases of Ricord's, and found that softening and elimination of syphilitic tubercle had given rise to the stethoscopic signs of phthisis. Ricord describes the morbid appearances as violet coloured stains on the surface of the lungs, and beneath these stains indurated kernels, like the little patches of pneumonia found in cases of purulent absorption. Little caverns are also found, filled with a grayish pultaceous secretion. In one case he found all the characters of the *gumma nodus*, or syphilitic tubercle, as commonly observed in the

cellular tissue, in lumps as large as peas, yellow, hard, not vascular, creaking under the edge of the bistoury, some being softened like true tubercular matter.

I have extended this chapter somewhat beyond the due bounds, because I have so often had grounds for my belief that latent syphilis was the real though unsuspected cause of many diseases called by other names ; and I have been anxious to prove that the poison may induce a condition of the blood which must not only modify every disease, but also become the cause of disease in some of the organs which depend upon a supply of pure blood for their health. The general symptoms leading to a suspicion of latent syphilitic disease may, as I have explained, in many cases depend upon other causes, but that in very many others the suspicion proves correct observation has thoroughly convinced me. Those who have seen much of secondary syphilis in its worst varieties, who have watched the haggard, collapsed, melancholy countenance, the shrunken cheeks, the sunken eye, the leaden complexion, the fœtid breath, the despondent manner, the listlessness, lassitude, and weakness, can never

mistake the case when it is presented in such an aggravated form, nor are they likely to misunderstand even less marked characteristics of the same disease, when reminded that they may at times expect to find them in patients suffering from other affections, though clear evidence of venereal taint, in the shape of syphilitic eruption or ulceration, may be wanting.

It is of the utmost importance in practice that such a complication of disease should be clearly recognized and promptly treated. It is therefore most fortunate, that one of the most valuable remedies in chronic gout has also a specific power over many forms of secondary syphilis. In the general state of disease just described, the effect of a few doses of iodide of potassium appears quite magical. Sound refreshing sleep will sometimes follow the very first dose, and the rapidity with which the patient recovers health and strength is astonishing. If common causes had produced the general constitutional disease no such immediate good effects could be expected to follow. Even in gout and chronic rheumatism, where these effects are also most evi-

dent, amendment is much more gradual. Thus, in doubtful cases, the effects of the remedy become valuable means of determining the nature of the disease, and of assisting us to decide whether the symptoms depend upon latent poison or obscure organic disease.

## CHAPTER IV.

ON THE MORBID ANATOMY OF GOUT, AND ON VARIOUS LATENT OR IRREGULAR FORMS OF THE DISEASE DEPENDENT,

1. Upon deposits of saline and earthy matter in or upon the fibrous tissues.
  - a. The fibrous envelopes of the brain, spinal chord, nerves, and organs of the senses— $\beta$ . The fibrous coat of the arteries and the fibro-serous membranes, within and around the heart— $\gamma$ . The fibrous tissues of the lungs and air passages— $\delta$ . The aponeurosis of the muscles of the head, chest, and abdomen— $\epsilon$ . The fibrous coat of the testicle.
2. Upon the efforts of nature to throw off gouty matter from the blood through the kidneys.

THE most violent and characteristic symptoms of gout are manifested in or around the joints. The most dangerous are those which arise from affections of internal organs. The former are more easily and generally recog-

nized ; they are therefore regarded as the most common, and probably may be, but by no means so much more so as is generally supposed, the latter being very frequent, and equally obvious to the practised eye. It will be necessary, however, before discussing the pathology of the internal varieties of gout, to describe the changes which take place in the parts where the disease is most commonly observed, and then compare them with the changes in other fibrous structures.

In early attacks of acute gout it is difficult to determine the precise seat of morbid action, or, at least, of its local development. There is but little external evidence of disease compared to the intensity of suffering. I had an opportunity, however, of examining the foot of a gentleman, who died suddenly from apoplexy, during an attack of gout in the foot. He had previously suffered from three or four similar attacks in the same foot. The fascia around the digitometatarsal joint of the great toe was thicker, tougher, and more leather-like than natural, the synovial membrane of the joint being intensely red and quite dry. There was also considerable œdema of the whole foot.

M. Roche (*Dict. de Med. et de Chir. Prat.*, Art. *Goutte*), found the veins surrounding the articulation dilated and gorged with blood; the synovial membrane red, injected, and thickened with collections of sero-purulent matter in the synovial cavity. M. Ferrus (*Dict. de Med.*, Art. *Goutte*) found the membrane dry, injected, thickened, and deprived of its natural transparency, the synovial fluid not possessing its peculiar oily or lubricating properties. In one case he found blood, both liquid and in clots, in the synovial cavity. Portal (*Anatomie*, vol. i. pp. 62, 532) has seen the synovial secretion so concrete that it had the appearance of plaster.

Opportunities for examining the changes which have taken place in chronic gout are not unfrequent, and the museums of the College of Surgeons and different metropolitan hospitals, contain many illustrative specimens of the various stages and seats of the disease. In ordinary chronic gout the deposits are found in and around the joints—upon or beneath the periosteum—in the sheaths of tendons, and in the bursæ, especially that over the olecranon. These are the fibrous structures for which the

affinity of gouty impurities in the blood appears to be greatest, in them the deposits are most frequently observed, and it is from comparison of the deposits in them, with those of other fibrous structures, that we are enabled to determine the nature of the latter deposits and ascertain their cause.

Deposits in and around the joints affect the capsule, synovial membrane, tendon, cartilage, and bone. Cruvelhier has found the ligaments infiltrated with concretions, some projecting towards the articulations, others outwards. M. Ferrus (*Dict. de Med.*, Art. *Goutte*) observed the capsule thickened and its fibres separated by deposit, the cellular tissue between the fibres infiltrated with a thick serosity. In the joints of most persons who die after having suffered from chronic gout, the surface of the synovial membranes of the affected joints are either much drier than in the natural state, or, if moistened, it is by a watery serum, very different from the oily, lubricating, healthy synovia. In the case of a gouty woman who died at the Salpêtrière, M. Ferrus and M. Rostan found several clots, and liquid blood also, in the cavity of the knee-joint.

M. Roche (*Dict. de Med. et de Chir. Prat., Art. Goutte*) found the ligaments red, injected, and thickened, small purulent collections existing in the surrounding cellular tissue.

The most frequent seat of articular deposit is between the synovial membrane and cartilage. It lies in patches, giving a mottled appearance and an irregular level to the articular surface. It has all the properties of a layer of dry plaster, irregularly spread beneath the synovial membrane. Mr. Toynbee has unequivocally demonstrated the existence of synovial membrane lining the surface of articular cartilage, and of gouty deposit upon its attached surface. This is the earliest seat of deposit. It is afterwards met with in the substance of the cartilage, gradually taking the place of the healthy structure and afterwards of the synovial membrane also. The articular extremities of the bones are sometimes found without either cartilage or synovial membrane, a layer of gouty deposit, like hard plaster, having taken the place of these tissues, and encroached upon the structure of the bones themselves. In one of the specimens in the museum of St. Bartholomew's, in which there

is deposit consisting principally of carbonate of lime on the articular surface of the cartilages, portions of this white substance were found in a fluid state in the articular cavities of nearly all the joints, around them, and in the adjacent tissues.

M. Ferrus (*loc. cit.*) found the cartilages thicker and softer than natural, permeated by injected vessels and studded with points of vivid redness. Deposit is first observed in minute specks, which increase in number and size until they coalesce and gradually replace the whole cartilage, which often appears thinner than natural. The progression may sometimes be traced in different joints of the same body. When the cartilage dies, the foreign matter it contains becomes much more apparent than in the recent state.

The bones, themselves, do not escape. M. Ferrus has found them softened, partly destroyed, and the cancellated structure filled with blood. The fourth figure in Cruvelhier's ninth *livraison* shows small cretaceous masses in the substance of the bone, at some distance from the cartilage of the astragalus. In an-

other part of the substance of the bone, near the articular surface, where the cartilage was perfectly healthy, he also found similar deposit. In one case he found a nodule in the centre of the patella, the bone being healthy, but a layer having been deposited between its anterior surface and the fibrous coat which covers it.

When deposit has existed for a long time, and has formed in large quantities, the joint becomes ankylosed. When complete ankylosis has taken place the cartilages are found to have disappeared completely, the osseous surfaces eroded, and the excavations filled with earthy and saline matter. Sometimes the bones composing the smaller joints are, as it were, soldered together, the plasty masses being disposed around them irregularly for a considerable thickness. When the joint is quite stiff, the muscles acting upon it either become atrophied, or pass into a state of rigidity and contraction. Cruvelhier has found the deposit not only in their fibrous sheaths, but also in their substance, in the form of encysted nodules. He has seen a layer of deposit half an inch

thick, all along the fascia, separating the muscles of the calf of the leg. The gouty concretions which are found around tendons are hard, sometimes lamellated, with a drop or two of liquid in the centre. It would appear that they arise from a species of transudation of synovia through the attached surfaces of the synovial capsules of the tendons. M. Ferrus has remarked, that the exhalation of serous membranes from their adherent surfaces, is a pathological phenomenon too much overlooked, as the arachnoid furnishes frequent examples of it, serous collections being frequently found between this membrane and the dura mater.

The periosteum is sometimes the seat of deposit just where tendons are inserted into bone. This gives rise to spasmodic movements of the attached muscle. Sometimes, directly a patient puts his foot out of bed, spasmodic action of the extensor muscles of the leg is thus produced, at times with the most horrible pain. The same thing occasionally follows stretching the limb on waking. The situation of the pain, thickening, and tenderness on pressure, show the nature of the case. The deposit is often observed on the periosteum of

the phalanges, and occasionally long nodular swellings may be observed or felt all along the surface of the tibia or ulna.

The tendons are often very hard in gouty subjects. In one of my patients I had predicted the occurrence of the rupture of the tendo-achillis, shortly before it happened, from having observed its extreme hardness and rigidity. The action of tendons is also impeded by deposit in the sheath. Cruvelhier has found considerable masses of cretaceous deposit around the tendo-achillis, but not adhering to it. Many preparations may be seen in our museums, showing collections in the sheaths of the tendons along the fingers.

In the bursæ, the most common change is effusion into the cavity, causing considerable swelling. This is often observed in the bursæ behind the elbow, and between the deltoid and capsule of the shoulder joint. A large, soft, indolent tumour is formed, which varies considerably in size at different times. It sometimes becomes hard, red, and painful. I have seen one behind the elbow opened when in this state, and a thick gelatinous fluid evacuated. Most dangerous erythematous in-

flammation came on with low fever. Cruvelhier has found the sac thick, dense, and almost cartilaginous with concretions on the internal surface and in its substance. The substance contained in the cavity was like mortar in this case, and under the microscope resembled granules of lime placed side by side.

Subcutaneous deposit forms what are called *chalk stones*. A white semi-fluid effusion first takes place. The fluid portions are absorbed. The solid gradually becomes harder and more friable. The effused matter is not encysted when first lodged in the cellular tissue, although it is sometimes surrounded by inflammatory thickening of this membrane. More frequently, however, it is diffused among the cells, and at first into the subcutaneous cellular tissue. After considerable accumulation has taken place, the cutis gives way, and the epidermis alone covers the deposit. If the epidermis give way, or be opened by a puncture, the earthy matter and serum are discharged. The opening generally closes, but sometimes a violent attack of inflammation comes on around the concretions, with considerable diffuse swelling, extreme pain, and a deep purplish redness

of the skin of the whole hand or foot. The cuticle gives way. The chalky matter is discharged, and an unhealthy ulcer remains which pours forth thin, opaque, curdy pus. At times a sort of cicatrix forms, but it gives way repeatedly and fresh deposit is evacuated. Sometimes a perfectly dry hard lump of the lithates projects immediately beneath the epidermis, and causes neither pain nor inflammation. Subcutaneous deposit, however, seldom takes place until an advanced period of the disease, long after evidence has been afforded of the existence of deeper deposits.

From what we have seen in the first chapter respecting the chemical composition of these deposits, and from the evidence just detailed with regard to the nature of the morbid alterations in gout, important practical inferences may be drawn. The grand distinction between simple or rheumatic arthritis and gout is at once established. In the one case, saline and earthy deposits constitute the essential feature of the alterations, in the others no such deposits are observed. During an attack of gout, there is proof that the synovial membranes and other articular tissues are more in-

jected than usual, the venous net-works around the joints are full. The veins of the whole limb are distended and sometimes varicose. This accounts for the œdema and the induration of the cellular tissue so often observed during and after an attack. This fulness of vessels is accompanied by intense pain, and only ceases when the morbid matter contained in the blood is deposited, and thus removed from the circulation. I believe that in every attack of gout, there is more or less of this deposit. Even after the first, however slight it be, there is some swelling and stiffness left which only gradually disappears. The deposit is partially or wholly absorbed after a time, and those who have long intervals between the attacks, escape with joints not permanently injured. But at every fresh attack, some new deposit takes place. The affected joints are increasingly deformed, until complete ankylosis occurs, when the ankylosed joint is not again affected as the general rule.

The blood containing nitrogen in excess, in various forms of combination, some nitrogenized compounds are poured forth from it. Being overcharged with animalized matter,

the tissues nourished by it are more than naturally irritable. It would almost appear, that over nutrition of cartilage and of the white fibrous tissues, led to an excess in the proportions of their organic constituents, and to an effort of nature to make up the deficiency of inorganic matter by increased deposit, pain and fever being induced by irregularity in the process, and injury to the textures which are the seat of the abnormal deposit.

In endeavouring to determine how far the morbid conditions of joints and the parts immediately surrounding them, are imitated in similar tissues in other parts of the body, some important considerations present themselves. We have seen how gouty deposits are preceded by vascular congestion ; how they gradually affect the surface and substance of the tissues ; how they increase in quantity and consistence ; how they injure the structures in which they are formed ; and, lastly, how the proportions of the alkaline and earthy lithates and phosphates of which they consist, differ under varying conditions of the general system. In vigorous over-nourished individuals, lithic acid or the lithates abound in the urine, and constitute

the principal proportion of the deposit about the joints. In persons of feeble power, or in those weakened by repeated attacks of disease, the phosphates are found in the urine, and form a large proportion of the deposit. But it would appear that the articular tissues have not so strong an affinity for the phosphates as for the lithates, while the phosphates are deposited more readily and copiously in the coats of the arteries, and in the investing fibrous envelopes of the nervous system and various organs, than about the joints, in many cases being mixed with carbonate of lime in greater or less proportion.

It would further appear that a certain degree of bodily vigour is required for the formation of the lithates in excess, and for their deposit about the joints with the corresponding symptoms of an acute attack of articular gout. Thus we see strong men afford the most frequent examples of the perfect type of gout. Delicate men are victims to the less marked but more dangerous varieties of the disease. Such females as are subject to the more regular attacks, are always of a strong and somewhat masculine frame, but the sex as

a general rule, are only liable to irregular and internal attacks. In Southern Europe, the warm climate, the inactive, luxurious, somewhat effeminate mode of life, the peculiar education, together with comparatively abstemious habits, give to the male something of a feminine character or constitution, and his diseases assimilate in many respects to those of the females of our climate. Thus, regular attacks of articular gout are exceedingly rare in the South, but the internal varieties are so common, that Italian physicians especially are constantly speaking of arthritic arteritis, arthritic apoplexy, arthritic neuralgia, arthritic dyspepsia, arthritic nephritis, and so on. They belong rather to the old schools of observation and nosology, than to the modern pathological school, and remind one very strongly in their conversation and writings on gout, of the works of Stoll, Hoffmann, Van Swieten, Musgrave, &c., which abound with instances of mental alienation, epilepsy, melancholia and hypochondriasis, coma, obstinate cutaneous affections, ophthalmia, angina pectoris, and various internal inflammations, alternating with attacks of external gout, relieved by the

external affection, produced or restored by its retrocession.

It will probably be found that until very lately modern pathologists have erred in regarding the anatomical characters of diseases as the disease itself, and have mistaken morbid alterations of the solid structures of the body, which are merely effects of disease, for the cause,—and have overlooked derangements in the processes of vital chemistry which produced the changes so important to their eyes, and so truly important as the immediate cause of prominent symptoms and functional disorder. But, as organic chemistry has been brought to the assistance of the pathologist, the alterations in the blood upon which our forefathers speculated, and to which they attributed such importance, have been verified, and we are beginning to acknowledge that many of their theories, deduced from observation but long stigmatized as fanciful, have a solid foundation in truth. It has become the fashion to say that females are not subject to gout, and that instances of wandering, irregular, retrocedent, or metastatic gout, only existed in the imagination of the older authors; but

daily experience must convince men of experience and reflection that the old school was right. We repeatedly see persons who have long suffered from general *malaise*, obscure uneasiness, restlessness, loss of appetite, but no obvious disease, relieved completely by an attack of gout in the foot. Again, it is not at all unfrequent, that a person who has suffered from time to time, perhaps periodically, from regular gouty attacks, and has not changed his habits of living, passes over a much larger period than usual without an attack. But he falls out of health and is seized, perhaps suddenly, with some internal disorder which resists all ordinary methods of treatment, but yields at once to the remedies for gout. Others who have inherited a tendency to gout, but who are of a delicate, feeble habit, and have never experienced a regular attack, become subject to some peculiar and puzzling disease, which disappears when gout attacks a joint, or only yields to treatment for gout. Perfect metastasis is also sometimes observed, though very rarely.

Further consideration of the natural history of gout—of the series and progression of symp-

toms to which a gouty person is subject—shows that in early life, and in strong persons, the most extreme parts of the body, those furthest removed from the centres of life, are the parts attacked. As age advances, as the bodily powers decrease, the disease shows itself in the elbows and knees; afterwards, about the trunk, in some form of lumbago or pleurodynia. It would appear to require a certain amount of vital force or bodily vigour to force the lithates circulating in the blood through the capillaries of the extreme portions of the limbs. In delicate men, in females, and in strong persons, enfeebled by long-continued disease, there is not this power; accumulation and transudation accordingly take place in parts nearer the centres of vitality. The gouty matter is in the blood, and after being deposited in the joints, nearer and nearer to the trunk, it is not thrown off even in the nearest, but continues to circulate throughout the body, and produces indigestion, loss of appetite, flatulence, pains and cramps in different parts of the body, and dejection of mind, terminating in some cardiac, apoplectic, or paralytic affection. In a strong healthy person it is carried

off by the kidneys or skin, but as it accumulates, or the person is weakened, its chemical composition undergoes alteration, and it falls upon the joints or upon some internal organ.

When all this is fairly considered,—when the general distribution of white fibrous tissue is remembered,—and when the increasing proportion of the phosphates in the deposits of feeble persons is recognized, much will be done towards establishing the law that, AS IN STRONG PERSONS CERTAIN DERANGEMENTS IN THE PROCESSES OF NUTRITION LEAD TO DEPOSITS OF THE LITHATES IN THE FIBROUS TISSUES ABOUT THE JOINTS, SO, IN DELICATE OR ENFEEBLED PERSONS, THE SAME DERANGEMENTS LEAD TO DEPOSITS OF THE PHOSPHATES IN THE FIBROUS TISSUES OF INTERNAL ORGANS.

a. Deposits in the substance, or upon the surface of the fibrous envelopes of the brain, spinal chord, nerves, and organs of the senses, are found occasionally, after death, in the bodies of those who have suffered from chronic gout; but not much has hitherto been done towards establishing the precise relation between the symptoms during life and the mor-

bid appearances after death. Still we find Hoffmann (*De Doloribus Arthriticis*, vol. ii. p. 247) speaking of what he calls a spasmodic gouty affection of the head, in which he recognized disease of the dura mater. Portal (*Anat. Med.*, vol. iv. p. 78) records two cases of apoplexy following the sudden cessation of articular gout, in which he found white concretions in the ventricles of the brain, but he gives no analysis of their composition. Dr. Jahn, of Eisenach, found chalky tubercular masses in the fissure of Sylvius, and in the choroid plexus of gouty patients. They varied in hardness, often broke under the nail, and were encysted by hardened cellular tissue. Schonlein found in them lactates, phosphates, and lithates.

It is impossible to walk through the museums of the metropolis, and to observe the thin layers of calcareous substance which line the sides of the falx and other portions of the dura mater, or the oval plates of calcareous matter upon the aracnoid surface of the dura mater of the spinal chord, without remarking the general resemblance to the same deposit in the joints of gouty persons. The tissues are the same, the calcareous matter is the same, or

nearly so, and yet the cause of the deposition is so generally overlooked, that no history of the case can be found to determine the value of the specimen.

It is well known how frequently gouty patients die of apoplexy, and it would appear that the true cause of this apoplexy is calcareous degeneration of the arteries at the base of the brain. But the ordinary forms of apoplexy and paralysis differ materially from the usual affections of the brain or its membranes in gouty persons. It is true that the ordinary forms are sometimes observed. For instance, Dr. Parry, of Bath, met with two instances in the same year, of extravasation in the brain, after repelling gout from the feet by plunging them into cold water. Dr. Copland, in the article Gout, in his Dictionary, mentions the case of a medical friend who "was seized in the evening with symptoms of complete congestive apoplexy, for which he was bled and purged, but without restoration of his consciousness. On the following morning gout suddenly appeared for the first time, with great intensity, in the ball of the great toe of the right foot, and instantly removed all the apo-

plectic symptoms." Van Swieten relates cases of epilepsy, in which the return has been prevented by the occurrence of a regular fit of the gout; and Guilbert, in the French *Dictionary of Medicine*, gives cases in which insanity and epilepsy, of long duration, had subsided on gouty attacks coming on. It has not fallen to my lot to see any such marked cases as these, but I have seen various cases in which either by the circulation of impure blood through the brain, by alteration in the coats of its vessels, or by deposits on its membranes, a peculiar and distressing series of nervous symptoms has been produced in gouty persons. Just as in the female, gout is a frequent cause of hysteria, so all the varied symptoms of hysteria are sometimes observed in gouty men, even to the *globus* and *clavus hystericus*, as observed long ago by Whytt and Stoll. (*Whytt, Works*, p. 556—563. *Stoll, Ratio Medendi*, v. 437, 443, 499.)

The most common class of case is one in which the most distressing depression of spirits with sleeplessness, or sleepiness without sleep, are the prominent symptoms. This may occur without headache, or if headache be present it

is confined to the forehead and temples. Light and sound are not complained of unless there be headache—in that case they are intolerable. All these symptoms alternate with gouty affections of the joints, or when the more persistent and chronic forms are co-existent.

In other cases, also frequently observed, there is more or less general feebleness, listlessness, tottering walk, giddiness, and torpor of the mental faculties. With all this there may be a very irritable temper, and liability to violent fits of passion upon slight excitement. Neuralgic pains may be complained of in the forehead, eyeballs, or ears, or distressing continuous pain in the nape of the neck. If an acute attack comes on in the joints all this is relieved, and the mental powers become again acute and active. Should there be return, after recurrence of acute attacks, to the former condition, the nervous symptoms are aggravated, the sight and hearing becoming imperfect from the deranged nutrition of the brain and nerves.

In a third class of case there is no great pain or special suffering complained of, but there is a sense of general depression, universal

uneasiness, distressing weariness, and often a constant fear of death, of insanity, or of being poisoned. This may or may not be accompanied by itching of the skin, tremors in the limbs, neuralgic pains about the head or chest, and oppression at the pit of the stomach. All this may go on, with longer or shorter intervals of tolerable health, for years, yet no regular fit of gout may come on, and when it does it is not acute enough to overcome the old distress, but is irregular and tedious, and only adds to the pre-existing symptoms.

When the dura mater has been specially affected there have been general headache, the organs of the senses irritable and painful without increase of their special sensibility, the pain being paroxysmal, with either marked rigors or alternations of warm and chilly sensations. Dr. Goolden has described a form of "periosteal disease affecting the dura mater," characterised by agonising pain setting in at eight or nine o'clock at night, and lasting till three or four in the morning, the patient being free from pain during the day, the morbid appearances showing thickening both of the dura mater and the inner table of the skull.

He refers the disease most frequently to the influence of mercury on the constitution, and regards it as a general morbid condition, giving rise to "Congestion of the periosteum, including the dura mater, with deposits of earthy matter between the membrane and the bone." He does not appear to consider gout as one of its causes, although he sees in such cases "painful swellings of the tarsal and metatarsal, as well as carpal and metacarpal bones, often observed to remain after attacks of gout, when all active signs of gout have subsided." They are very different from chalk-stone deposits, though they disfigure the hands.

Convulsive affections are uncommon in the gouty, but they are occasionally observed and simulate epilepsy. They differ from ordinary epilepsy, however, as the *aura* is wanting, the fits coming on without warning. They have generally been preceded, for a long time, probably for many years, by other cerebral symptoms, as tinnitus aurium, muscæ volitantes, dulness of the mental powers, and loss of memory. A disposition to faintness may also precede the convulsive attack. The convulsive movements sometimes affect one side of the

body only, and they seldom last many minutes. Should they recur frequently the intellect gradually fails, and the patient approaches a state of imbecility, or falls into a condition of partial or total paralysis. Dr. Parry, of Bath (*Elements of General Pathology, &c.*, pp. 363, 376), knew a gentleman who was subject to epilepsy, which entirely ceased after the commencement of regular gouty attacks—and he says, “In several instances I have seen fits of epilepsy wholly superseded by those of gout.”

The cases of sudden congestive apoplexy just alluded to in the practice of Drs. Parry and Copland must be rare. Such a case as the following is probably more frequent. A gouty patient, aged forty-five, suffered for three months from headache on one side of the forehead. It was a pulsating piercing pain, confined to one spot, and extending from thence over the head. It was not permanent, sometimes disappeared for days together. One evening the pain became suddenly very intense; he went to bed, slept, and woke next morning with paralysis of one side of the body, the face, tongue, hands and feet, being paralysed. A very small general bleeding was

practised, leeches applied to the forehead, saline diuretics and diluents given, and external stimulants applied to the extremities. The power gradually returned to the limbs, but was not completely restored until after a smart attack of gout in the feet.

It would appear that in the apoplectic affections of the gouty, delirium is rare, stupor or coma general. After long continuance of one or other of the forms of nervous affections just described, extreme weakness, almost amounting to paralysis, comes on. The gait is irregular and faltering, some giddiness or stammering is observed, and then the patient sinks into a helpless semi-comatose condition. He remains in bed almost in a state of unconsciousness, although he can hear and see, and on being roused will answer a simple question, and put out his tongue, or look at a watch when told to do so. Such cases as these are sometimes secondary to affection of the heart, and are almost always connected with great alteration in the blood, shown by disposition to passive hæmorrhage, spots of purpura on the extremities, or the presence of albumen in the urine.

## GOUTY AFFECTIONS OF THE SPINAL CHORD.

When the nervous branches and trunks have suffered from gout, the disease may extend to the spinal chord, and produce loss of sensation and motion, varying in degree with the amount of the spinal derangement. Dr. Graves showed (*Clinical Medicine*, p. 589) that "Gouty inflammation of the nerves and their neurilema may, in process of time, extend to the spinal marrow and its investments, and give rise to derangements of the latter, terminating in ramollissement and structural degeneration." In one case, a gouty patient, who frequently repelled an attack by exposure to cold in fishing and shooting, died, after long continued paralysis, and the chord was found softened to the consistence of cream, opposite the last cervical vertebra. In another case, "The spinal marrow, from the fourth cervical vertebra down to its dorsal termination, was found converted into a morbid mass of an ash-gray colour and pulpy consistence." The patient had suffered extremely, but he experienced "well marked ease when the gout appeared in the feet."

The little that is known of gouty deposits in

the sheaths of the nerves, will be found in the Chapter on Rheumatic Gout.

#### THE ORGANS OF THE SENSES.

The *eye* very frequently suffers in gouty patients. Dr. Jacob asserts that it "is sometimes attacked by gouty inflammation even before any joint or other organ has been affected." Dr. Fuller states that, during the time he was medical registrar at St. George's Hospital, the eye was inflamed in 11 out of 130 cases of rheumatic gout; while during the same period there is no record of such inflammation in more than 4 out of 379 cases of acute and sub-acute rheumatism. In unmixed gout I believe the proportion of cases in which the eye is affected, to be greater than in rheumatic gout.

Morgagni (*De Sedibus et Causis Morborum*, p. 57) suffered himself, from violent inflammation of the eyes, which resisted all kinds of remedies, but disappeared when a slight attack of gout came on in the foot.

Cataract is frequently observed in the gouty, and, as might *à priori* be supposed, in the form of calcareous degeneration of the lens or its

capsule. But iritis is the most common form of disease of the eye in the gouty.

In arthritic iritis the appearances are very characteristic. Varicose vessels run along the conjunctiva of the globe. The sclerotic vessels are injected with livid blood. A white foam accumulates between the lids and at their angles. There is a blueish-white opaque ring or zone at the junction of the cornea and sclerotic. The pupil is irregular, often dilated. The iris appears thinner than natural. The eye is exceedingly hard. Vision is much impaired. All this appearing in a patient known to be subject to gout, or in one labouring under anomalous symptoms, who has either inherited the disease, or rendered himself liable to it by his habits of life, are fully sufficient to determine the gouty nature of the iritis. Scrofulous iritis occurs in a very different class of cases. In syphilitic iritis we have the inner zone of the iris rusty red, and its surface raised into little hillocks, as if by small pimples. The general symptoms are corresponding. In gonorrhœal iritis, with synovitis, we have the aqueous humour in both chambers turbid from the effusion of lymph, lymph filling up the

pupil and lining the chambers. In simple iritis the patient is otherwise healthy, the corneal sclerotic zone is intensely red, the pupil irregularly contracted, and lymph is effused in much smaller quantity than in the gonorrhœal form of the disease.

When the eyelids suffer, as they frequently do in the gouty, from chronic inflammation, the cause will often be found to be earthy concretions in the lachrymal ducts. It is sometimes necessary to lay the ducts open in order to remove the concretions. They generally consist of the phosphate and carbonate of lime in varying proportion.

The *ear* frequently suffers in gouty persons. In the works of Vering, Lincke, and Frank, descriptions will be found of rheumatic and gouty otitis. Mr. Wilde, however, in his late work on *Aural Surgery* (p. 266), says, that he has never seen a well marked example of *gouty* otitis, nor read "a description of that disease which afforded any one pathognomonic which could be relied upon." Mr. Harvey has written a work on rheumatism, gout, and neuralgia, as affecting the head and ear, but, as Mr. Wilde remarks, "the symptoms of the

different forms of gouty otitis therein detailed are common to every other form of aural inflammation." This is what we might *à priori* suppose. Inflammation once set up in the ear, the symptoms cannot vary very greatly, yet they will be much less under the control of local treatment if the cause be a constitutional disease. And we should always look to gout as a cause of diseases of the ear in those who are liable to its manifestations in other parts of the body. The otitis also really has some peculiarities. For instance, it will disappear suddenly and spontaneously on an attack coming on in another part of the body, and the discharge from the external ear contains much earthy deposit. Dr. Graves says of one case, "When he is free from gout in his foot, the discharge from his ears is most profuse, and of a thin mucous character. This has been examined under a microscope, and always presents a gritty deposit, probably the phosphate of lime." In chronic affections of the ear under gout, the earthy deposits form in the cavity of the tympanum, and in the mastoid cells. I have seen several instances of this among Mr. Toynbee's beautiful collection of specimens,

illustrating the morbid anatomy of the ear. Dr. Garrod has found the external meatus filled with chalky matter, and Mr. Harvey has seen it in the cells of the mastoid process.

The external ear, lobe, or cartilage, the meatus, its integument or ceruminous glands are much more frequently affected than the middle or internal ear. Dr. Graves says, "Mr. Daly, of Henry Street, knows a gentleman, the lobe of whose ear is sometimes attacked suddenly by gouty congestion, accompanied by agonizing pain, but which never lasts more than a few hours." Dr. Graves adds, in a subsequent edition of his *Clinical Medicine*, "I have myself suffered from a similar attack in the cartilage of the ear, which did not last longer than an hour, disappearing on the occurrence of gouty pains in the fingers." I believe, that in the majority of gouty patients who have deposits about the joints, more or less deposit will also be found on the external ear. In some cases the deposit in the ear may be observed before it appears in any other part.

A very common affection of the external ear in the gouty, is a dry, hot, itching condition of the meatus. The skin is sensitive to the touch,

red, covered with loose scales of epidermis or dried cerumen. The secretion of cerumen is checked, and little furuncular pustules form on the concha, which are very painful, and discharge a whitish sero-purulent fluid containing much earthy deposit. The hearing need not be much affected. When it is, the membrana tympani is thickened and opaque, or covered by a scale of dried cerumen.

Although I have never seen a case, I have no doubt that some of those instances of oto-meningitis, in which the brain suffers secondarily to the ear, arise from gouty inflammation of the cavity of the tympanum.

*β.* The fibro-serous membranes within and around the heart, and the fibrous coat of the arteries, not unfrequently become the seat of gouty inflammation and deposit.

Dr. Hope, in the article "Arteritis," in the *Cyclopaedia of Practical Medicine*, remarks upon the frequency with which gout is attended with arterial ossifications, and their frequent concomitant angina pectoris. He quotes Krey-sig's opinion, that calcareous incrustations are *only* produced by gout. Angina pectoris was

called, by many old writers, arthritic asthma, or diaphragmatic gout.

Dr. Baillie related cases in which palpitation and other signs of disordered action of the heart disappeared with an attack of gout, and Dr. Haygarth (*Medical Transactions*, vol. iv.) has recorded a case of gouty carditis, in which bleeding aggravated all the symptoms, but a mustard poultice applied to the wrists, "soon and considerably relieved" the disorder of the heart. A gouty attack came on in the wrists, with copious lithic deposits in the urine, which, with the history of the case, left no doubt as to its nature.

Persons subject to gout, especially in its latent forms, and before its local symptoms manifest themselves, are very liable to irregularity and disorder in the action of the heart. The circulation is embarrassed. The contractions lose their power, become frequent, fluttering, and sometimes intermitting. This is often so slight as scarcely to attract notice, but is sometimes so severe as to form the chief complaint, and lead to suspicion of organic disease of the heart. It is a very insidious affection. Lassitude and depression of spirits, with a

very feeble pulse, followed by irregularity in the action of the heart, are the usual sequence of the symptoms. The least exertion leads to a feeling of sinking and faintness, and complete syncope then follows.

In more acute gouty affections of the heart, great pain in the region of the heart, with difficulty of breathing, faintness, and violent palpitation cause great distress. In some cases an attack of this kind is so violent and unexpected, that it leads to sudden death.

Structural disease of the heart in gouty persons, is not only shown in the earthy deposits in the valves, the coronary arteries, and pericardium, by which the circulation is impeded and the nutrition of the muscular fibres rendered imperfect, but in some cases the muscular fibre itself undergoes the process of fatty degeneration. This formation of fat is but one of the signs of defect in the nutritive processes, which may be expected when the blood is in a morbid condition.

Dr. Stokes, in his recent admirable work on the *Diseases of the Heart and Aorta* (page 525) says, that "Most cases of the so-called gouty palpitations are examples of a confirmed dis-

ease, which is an enfeebled and dilated state of the heart, combined with atheroma in the aorta." He remarks very justly, that the attacks of palpitation which so commonly precede a first or second attack of gout, and depend on dyspepsia, are not followed by cardiac disease, but that after repeated attacks, the "practitioner cannot be too cautious in attributing disturbance of the heart to gout, independent of anatomical change."

Dr. Stokes's observations in the cases of sudden death, attributed to "gout in the heart," are also of great value. After long continuance of a gouty condition of the system, or after a protracted and severe attack of gout, whether the heart be simply weakened, or in a fatty and atrophied condition, sudden death may occur by syncope, apoplexy, or an attack of cardiac asthma. The cause is sudden failure of the powers of the heart. The patient has been kept days or weeks in the horizontal position, his accustomed stimulus denied, low diet probably enforced, and, as Dr. Stokes very truly says, "in this way many a valuable life has been lost." The patient "does not die of gout in the heart, but he dies of the bad treatment

of gout; and his death is caused by failure of the heart, the weakened state of which is so often overlooked." (*Loc. cit.*)

Dr. Stokes has also shown that gouty irritation of the aorta may lead to the suspicion of intra-thoracic aneurism.

The most common affection of the veins in gouty persons is haemorrhoids, and these are usually dependent on hepatic congestion. Bleeding from them is very common, and often gives great relief, but sometimes it is sufficiently copious to excite alarm. This must not be confounded with the much more dangerous symptom, melæna, or oozing of blood from the capillaries of the gastro-enteric mucous membrane, which is sometimes observed in the last stages of gout, and shows that the composition of the blood has been entirely changed. I have seen black pitchy blood escape in this way from every mucous surface of the body,—conjunctiva, nose, fauces, stomach, bowels, and bladder.

Dr. Parry mentions a curious instance (*op. cit.* p. 391) in which "haemorrhoidal swellings with discharge having, in a male patient, continued for three weeks, at length wholly dis-

appeared, *three hours* after which the gout appeared in one extremity."

γ. The fibrous tissues of the lungs and air passages.

Pinel, in his *Nosographie*, states, that Frederick the Great died of gouty hydrothorax. Dr. Darwin, in his *Zoonomia* (iv. p. 219), says, "When gouty patients become much debilitated by the progress of the disease, they are liable to dropsy of the chest." Many more quotations might be given, if it were necessary, to prove that effusion at the pleura is far from uncommon in the later stages of gout. I have more than once observed the fluid to disappear very rapidly, on a gouty attack coming on in a joint. In one case effusion on the right side, shown by percussion to extend as high as the second rib, was absorbed entirely in less than twenty-four hours. The effusion does not come on suddenly; indeed it may go on to a dangerous extent before suspicion of the presence of fluid is roused. The patient may complain of some aching in the chest, generally on one side, and increased by lying on that side. If on both sides, he is

constrained to lie on the back. There may or may not be dyspnœa and palpitation. The symptoms may continue for several days, causing uneasiness and a general feeling of indisposition, and may cease spontaneously, or disappear with an acute attack in a joint, copious perspiration, diarrhœa or diuresis, or they may increase to a dangerous extent, the pain becoming very acute, the action of the heart laboured, and the difficulty of breathing very great. Some patients habitually suffer from attacks of this kind, of greater or less severity, and call them gouty asthma. In one of Dr. Parry's cases a gouty attack was followed by a sudden paroxysm of spasmodic asthma, which proved fatal in twenty minutes (*loc. cit.*). But percussion shows that the presence of fluid in the pleural cavity is the real cause of the distress, and that relief is only produced by its absorption.

Bronchorrhœa is not an uncommon symptom in chronic gout. Dr. Stokes (*Diseases of the Chest*, p. 90, 91) says, "In the gouty habit we see attacks of irritation in various organs, among which the bronchial membrane may be affected, and the patient labour under a severe

and obstinate cough. And even, as has been well remarked, an attack of bronchitis from cold, in the same diathesis, will often show itself with the peculiar characters of a gouty affection.

“The gouty irritation of the lung occurs under various forms and circumstances. Thus cough, dyspnœa, and expectoration, may precede a fit of gout, and rapidly and completely subside on its appearance ; on the other hand these symptoms may follow the subsidence of the arthritic attack. A patient may present all the symptoms which have been supposed to belong to hydrothorax, but which are really the consequence of pulmonary congestion and inflammation, and then shall alternate with gout. Or we may see a case, *in which such symptoms having been removed by appropriate treatment, a fit of gout has immediately appeared.*”

M. Schönlein has observed some gouty patients, about forty or fifty years of age, begin to complain of cough, heat in the larynx which induces the cough, viscid sputa increasing in quantity, and sensation of weight beneath the clavicle, other better known gouty symptoms

disappearing. The sputa become filled with masses like barley out of barley-water, breaking down under the pressure of the finger, and varying in composition with that of the urinary sediments.

When the diaphragm is affected the suffering is most intense, the symptoms resembling those of the most acute diaphragmatic pleurisy.

The pathology of these affections is not well made out, but we have good grounds for believing that the fibrous tissues are first affected, and that the serous and mucous membranes are affected secondarily, or by contiguity.

8. The sub-cutaneous fascia, or the aponeurosis of the superficial muscles of the head, chest, and abdomen, are sometimes the seat of gouty inflammation and deposit, and the symptoms often lead to suspicion of some internal inflammation of the viscera of the different cavities, and mistaken treatment in consequence.

When the jaw is affected there is often obstinate toothache, and many a sound tooth has been uselessly drawn to relieve pain, which can only be removed by remedies acting on the

whole system. The irresistible tendency to grind the teeth, which some gouty patients have, may arise from periostitis of the jaw, but Dr. Graves refers it to gouty irritation of the dental nerves.

Redness of the nose is often a cause of great complaint. The cartilage is sometimes the seat of permanent deposit, but more often there is a transient fulness of the integument only, as in a case recorded by Dr. Graves, where the nose grew hot daily at 3 P.M., the heat continuing four or five hours, the part becoming of a bright and then of a purplish-red colour, which spread to the upper portion of the cheeks, and was accompanied by some uneasiness but no pain.

The seat of superficial neuralgia of the face and head is very doubtful. In some cases the cutaneous nerves appear to be affected solely; in others to suffer secondarily to the fascia or aponeurosis. In either case the pain comes on in sudden paroxysms, shows a tendency to periodicity, may last from four or five hours to a week, and come on at intervals of from a month to a year of perfect health. The slightest touch or draught of air increases the pain.

It is quite superficial, with little or no redness, and flies instantaneously from one part to another.

ε. The fibrous coat of the testicle is often affected in the gouty, and the irritation frequently extends to the tunica vaginalis and causes hydrocele. The only peculiarity worth notice in this affection, is the suddenness with which the symptoms or the effusion may disappear when gout appears in any other part of the body.

2. The forms of latent or irregular gout, depending on the efforts of nature to throw off gouty matter from the blood by the kidneys, are various. In some cases the kidneys, in others the ureters, bladder, or urethra, are the seat of the most prominent symptoms.

When the kidneys are healthy they remove from the system such abnormal constituents of the blood resulting from derangements in the processes of primary or secondary assimilation, as are not excreted by the lungs, liver, or skin, provided these abnormal constituents are either in a state of perfect solution, or

capable of being rendered soluble. They also compensate, by increased activity, for defective action in other excreting organs. The result is a morbid condition of the urine. It contains elements it would not contain, were the body in a state of health, in the same quantity if at all. But this cannot be said to be a urinary disease. The kidneys have not only done their duty but they have performed a natural curative or purifying process, removing noxious matters from the blood, and thus assisting to prevent disease. It is the continuance of extra work which leads to disease of the kidneys—the passage of irritating matters separated by the kidneys which leads to disease of the ureters, bladder, and urethra.

In the early stages of gout, when lithic acid is formed in abundance, the general rule is that it is not found in the urine just before or during an attack in a joint. It is in the intervals of the joint attacks, or when the disease may be said to be latent, that it is in excess in the urine. It often passes away in concretions of considerable size, and excites irritation in its passage. One of the most common varieties of lithic acid deposit in the

urine of gouty persons, is in the form of small round pale yellow masses, generally about the size of a pin's head, but sometimes attaining that of a pea, in that case being rather calculi than deposit. Dr. Golding Bird calls this *pisi-form deposit*, and says, "It is remarkable for its persistence often during many years; it frequently vanishes for many months and then re-appears. I have generally observed the patient to remain free from gout during the presence of this deposit, and often to suffer from a severe paroxysm on its sudden disappearance. It is really remarkable what an enormous number of these minute calculi are frequently passed. I have met with cases in which upwards of two hundred, the size and colour of small mustard seeds, have been passed in two days." (*Urinary Deposits*, p. 133.) It is only in cases of strong persons, however, whose health has not suffered greatly from the duration or persistence of the fits, that any lithic acid deposit continues for many years. It usually alternates with others, and, as the system becomes debilitated, gives way to phosphatic deposits.

Deposits of lithate of ammonia, when abun-

dant, frequently cause very considerable irritation about the neck of the bladder. The lithate of soda, though occasionally observed, is a much less frequent deposit.

The aggregation of lithic acid, or the lithates, is the most frequent cause of the formation of calculus. Lithic acid not only forms a very large proportion of urinary calculi, but forms the nucleus of those of a different composition in at least two-thirds of our collections of calculi. In children the lithate of ammonia sometimes forms the entire calculus, and often constitutes the nucleus. Thus, in all stages of gout, there is a great tendency to the formation of urinary calculus, as the deposits of which they consist exist in the urine in unnatural quantity.

Deposits of oxalate of lime are not uncommon in gouty persons, but it must be remembered that they are very often produced by some temporary cause; the use of onions or turnips, tomato sauce, or a dose of rhubarb, having perhaps supplied the salt directly in the food. When persistent, and therefore independent of any such origin as this, they occur, in cases of irregular or suppressed gout,

in persons whose general power has been much lowered by venereal excesses, by excessive study, or attention to business. Such patients suffer extremely from lassitude, *tedium vitæ*, and fears of consumption. They sleep long and heavily, have a dry hot skin, blotchy face, and tendency to formation of boils, cracked furred tongue, feeble pulse, weakness about the loins and legs, and complain of fatigue on slight exertion, especially of inability to mount a hill or go up stairs. They also complain of flatulence after meals ; they loose flesh, and at times suffer so much from irritation of the bladder as to lead to suspicion of disease of the prostate, or the formation of calculus. These symptoms are more frequently observed in females, and are then almost always connected with leucorrhœa. In either sex when, under treatment, these symptoms disappear, and the lithates begin to reappear in the urine, a gouty attack is very apt to come on.

During the later stages of chronic gout earthy phosphates often appear abundantly in the urine, and are accompanied by great irritability and depression of the nervous system. In the more severe cases the phosphate of lime

forms the chief deposit. In the slighter ones, or those where the deposit depends upon an attack of dyspepsia, the triple phosphate occurs. In either case there is great gastric irritability, flatulence, an unconquerable desire to eat rapidly, and sensations of extreme exhaustion. The exhaustion may be explained by the abundance of urea the urine also contains. The quantity of phosphatic deposit is sometimes remarkable, and leads the patient to fear the formation of calculus, and not without ground. The urine contains, at the same time, quantities of mucus, which falling to the bottom of the vessel with the deposit of phosphates, forms a ropy mass. Sometimes this collects in the bladder, and leads to difficulty in evacuating it, and necessity for the use of the catheter.

After a time structural changes in *the kidneys* take place. They become diminished in size and their structure is condensed. Their surface appears shrivelled and granular. The capsule is unnaturally dense and white, and separates very freely from the gland. This is the condition so well described by Dr. Todd as "the gouty kidney." The decrease in sub-

stance is chiefly at the expense of the corticle portion. The microscopic appearances do not differ materially from those observed in wasting or atrophy of the kidney from any cause. Nutrition is imperfect, because the blood is impure, and the organ suffers in its structure. In one very interesting case which occurred to Mr. Ceeley, of Aylesbury, the kidney was sent to Dr. Todd, who found it wasted and contracted, as just described ; but, "in addition, there were deposits of lithate of soda in the uriniferous tubes of many of the cones. The particles of the salt are readily recognised by their peculiar processes (needles), which seem to radiate from a central mass : these are well figured in Dr. G. Bird's book. They filled up parts of some of the tubes, and here and there lay loose among the particles of the epithelium, some of which contained oil in considerable quantity." (*Medical Gazette*, June 18, 1847.)

When the ureters suffer from the passage of small calculi, or irritating urine, the symptoms are well marked, and are generally easily recognised.

Disease of the *bladder* is seen in various forms. In some cases the symptoms resemble

those of acute cystitis, but, as Dr. Todd has shown, the affection is analogous to gouty bronchitis. It is, in fact, rather a cystorrhœa, the secretion being purulent or muco-purulent. Sometimes it becomes ropy, and from admixture with saline or earthy deposit, causes more or less retention of urine in the bladder, which becomes alkaline, adds to the irritation already existing, and excites increased secretion of purulent matter.

Dr. Todd has also described very correctly another kind of gouty affection, which I have seen occasionally. The mucous membrane of the bladder is so highly irritable that it will not retain a tablespoonful of urine, and there is a constant desire to evacuate it as fast as it is secreted. This may be observed with almost any state of the urine, from the most watery to the most concentrated. It is sometimes accompanied by disease of the prostate gland. When the muscular coat of the bladder is affected, instead of the incontinence of urine we have retention, and the bladder becomes distended. The patient is quite unable to empty it, and suffers very much until relieved.

In all cases of affection of the bladder in the

gouty, the probable existence of calculus should be borne in mind, and the patient sounded, for it is of extreme importance to detect a calculus before it attains any considerable size, and never allow it to attain a size which may lead to the necessity for the operation of lithotomy, but to break it up by lithotrity, as soon after discovery as the state of the urinary organs will permit.

Gouty inflammation of the *urethra* is sometimes produced by the mechanical irritation of urinary deposits, but is often independent of them. It is frequently attended by a profuse white discharge, resembling gonorrhœa in all but the colour of the muco-pus. There is the same scalding during and after micturition. When the prostate and bladder are also affected in this way, the suffering becomes very severe, and the dread to pass water is constant. This affection is probably more common in rheumatic than in unmixed gout.

Among all these instances of irregular development of gouty action, I have not noticed one very common form, known as *gout in the stomach*, partly because the symptoms are well known, but principally because so little is ac-

curately determined as to the true pathology of the affection. We have every reason to believe that, in some cases, there is merely exalted sensibility of the mucous membrane, in others actual inflammation of this membrane, while in a third there is evidence of spasm or paralysis of the muscular coat; but I am not aware of any case in which the evidence of the correctness of these views, held during life, has been established, by examination, after death.

## CHAPTER V.

## GOUT IN THE FEMALE.

Peculiarities in constitution and habits of females which modify the evidences of gout—Various forms in which gout may be recognised in the female—Gouty dyspepsia—Derangement of the general health leading to general and local nervous affections—Irritable uterus—Abortion—Gouty deposits on surface of placenta—Leucorrhœa—Deformed hands.

HUNDREDS of persons suffer from the derangements of the assimilating processes which produce the condition of the blood constituting the gouty diathesis, who have never had any regular attack of gout. Sir Benjamin Brodie, writing to Dr. Gairdner, says, “A large proportion of the persons that come to me with what are esteemed to be local diseases, are in reality suffering from the influence of the gouty poison in the system, though they may have nothing which would commonly pass for gout.” Repeated observation has con-

vinced me that this observation is even more true with regard to the female than to the male sex.

I have already remarked, in the preceding chapter, that strong men afford the most frequent examples of the regular and acute attacks of gout, while delicate men suffer from less marked varieties of the disease. It has been a common observation, repeated in most books on gout, that females are not liable to this disease ; and if, by gout, the acute regular form is understood, the observation is correct, for it is only females of a strong masculine frame who show the disease in this form. In Southern Europe, as I before remarked, the habits and constitution of the natives give to the male something of a feminine character ; and, assimilating his diseases to those of the females in this country, acute regular gout is almost as rare as among British females. But the suppressed or irregular forms are very common, and so they are among our females, particularly in the upper classes of society.

The causes of this difference in the manifestations of gout in the two sexes, in this country, are referable, first, to the peculiarities

of the female constitution ; and, secondly, to the habits of the sex.

The female constitution is peculiar in many respects. The nervous system differs remarkably from that of the male. The brain weighs from four to eight ounces less, and with the nerves is more readily affected by mental or physical stimuli. The muscular power is less, in accordance with the size and general conformation of the body. Up to fifteen years of age, there is no great difference in the average weight of the two sexes, but in the adult, a constantly increasing difference is observed with advancing age. The size of the thorax is less, of the pelvis proportionately greater. The vascular system is peculiar from the periodical condition of the blood-vessels of the uterus, and from the composition of the blood. The blood of the female contains more water and less solid constituents than that of the male, the solids in the blood of the male being greater in the proportion of 32 per 1000. The solid constituents are still further diminished in women at the menstruating periods, still more so in various states of the system, attended by hysteria or leucorrhœa.

Many of the peculiarities of natural conformation, are much increased by habits of life. The natural excitability of the nervous system is increased by the study of music, painting, and poetry, the frequent custom of novel reading, and the cultivation of the imagination. This leads to an increase of sensibility, but a diminution of vigour; both being assisted by the inordinate use of tea and coffee, and the habit of sitting up late at night and sleeping late in the morning. The dress prevents free action of the lungs and heart, and of the muscles of the arms and back. The blood does not circulate freely in the skin from want of muscular exercise, and local congestions or excessive discharges are the consequence. It is not, however, in the very highest classes of society, that the females have so little regular active employment or out-door exercise. It is more among the professional and middle classes of large towns, that education is so especially directed to accomplishments, which enforce an amount of sedentary application precluding the possibility of sufficient exercise in the open air.

These peculiarities and habits are quite suffi-

cient to modify the external evidences of gout in the female, yet there are various forms in which the disease may be recognized.

One of the most common of these forms is, what may be called *gouty dyspepsia*. It is most frequently observed in ladies in the prime of life, unaccustomed to much exertion, who indulge freely in rich dishes, and eat a considerable quantity of sugar in various forms. They complain very much of flatulence, rumblings in the bowels, palpitation, and a load at the pit of the stomach after meals. They are either fidgetty and irritable in temper, or dull and desponding, believe themselves to be victims of some mysterious disorder of the heart or stomach, and consult a great number of medical men. The skin is generally dry and warm, and sensations of formication and titillation are often complained of. Sometimes there is no evident alteration in the skin, but at others there are chronic eruptions, papular, scaly, vesicular, or pustular. The arm-pits and groins are especially dry and irritable. Spots of acne are apt to appear on the face. The complexion is unhealthy, and the tendency to form pimples on the cheeks and forehead almost con-

stant. The urine varies very much ; sometimes it is copious and watery, at others, heavily charged with lithic acid or lithate of ammonia, and the oxalate of lime is not unfrequently met with. Menorrhagia is common, especially about the period when menstruation ceases, and in some ladies of relaxed tissues and sedentary habits, the loss of blood is so great as to lead to extreme danger.

All this is the result of excess of nitrogenized products in the blood, and the efforts of the excreting organs to purify the blood from these products. The gas formed in the stomach is but one instance of their efforts. Dr. Evans, of Newmarket on Fergus, has related a case (*Dublin Medical Press*, vol. ii.) in which immense quantities of nitrogen gas were expelled daily from the stomach, urea being deficient in the urine, but existing in the blood in large quantities. The composition of the gas secreted by this lady's stomach, may be compared with that of urea :—

	Gas.	Urea, according to Dr. Prout.
Nitrogen . . .	50 parts . . . . .	46.66
Carbonic Acid . . . . .	25 . . . . .	19.99
Hydrogen . . . . .	15 . . . . .	6.6
Oxygen . . . . .	10 . . . . .	26.66

and it will appear, that the urea existing in the blood and not thrown off by the kidneys, was excreted by the stomach in the gaseous form. The lady in this case was forty-seven years of age, and had suffered, more or less, since the age of twenty-seven. It is an extreme case, but explains the cause of the large evolutions of gas in the stomach and intestines of those who suffer from gouty dyspepsia.

*Gouty hysteria.*—The many points of resemblance between gout and hysteria have been forcibly insisted on by the older medical writers, but have been overlooked very generally by modern authors. Dr. Conolly and Dr. Laycock, however, have pointed out the frequent dependence of hysteria upon gout. In the article *Hysteria*, in the *Cyclopaedia of Practical Medicine*, Dr. Conolly refers to the stress laid by the older writers on the influence of the gouty constitution in predisposing to hysteria. He says, very justly, that there can be no difficulty in allowing that “Gouty, or any other morbid matter in the blood, may be the occasional exciting cause of those nervous irritations which characterise a susceptible temperament, just as, in other cases,

the same morbid matter, by irritating the nerves of the extremities, appears to excite the common pains of gout and rheumatism." Dr. Laycock, in his work on the *Nervous Diseases of Women*, shows how urea, or other nitrogenized constituents in the blood, accumulating in the system, give rise to "a gouty paroxysm; or failing this, excites irritation of different organs in succession, and produces in men the different forms of erratic gout,—in women, of anomalous hysterical disease; the symptoms varying in each individual, as one or other organ, weaker than the rest, falls under its noxious influence; so that, in one case, they will be those of mania; in a second, of thoracic disease; in another, of epilepsy; in another, of the hysterical paroxysm; or assume the form of angina pectoris, spasmodic action, or local neuralgiæ." (P. 170.) Dr. Laycock further states, very truly, "That of the many cases related by authors as anomalous hysterical disease, by far the greater portion were connected with a gouty diathesis, as indicated both by the formation of calculi, by the occurrence of regular paroxysms of gout, and by the descent of the individual from

gouty ancestors ; they are cases, in fact, which would have been better understood and better treated, if they had been termed anomalous gout ; but as the subjects are young females, they are, of course, set down as anomalous hysteria." (P. 163.)

Any attempt to describe the nervous diseases of females caused by gout, would lead to an enumeration of almost all forms of their diseases, especially of those usually considered as hysterical. The intestinal derangements, with tympanitis, neuralgia, or colic, the hysterical pain in the right hypochondrium, the cardialgia and gastrodynia, the hysterical vomiting and epigastric spasms, the morbid sensibility of the pharynx and fauces, hysterical palpitation, asthma, or bronchitis, loss or alteration of the voice—some forms of hysterical paraplegia or hemiplegia, more or less complete—chorea or tetanus—some of the curious paroxysmal affections observed in hysteria, and all the varieties of neuralgiæ and simulated inflammation, commonly called hysterical, frequently arise from the presence in the blood of the impurities which are the true characteristics of gout.

Some of the most common forms of gouty neuralgia may be noticed :—

The breasts are often the seat of this neuralgia. It commences by sensations of fulness and uneasiness, followed by some enlargement, darkening of the areola of the nipple, and extreme sensitiveness to the touch. The treatment of ordinary hysterical neuralgia of the mammae aggravates the complaint, and examination of the urine shows that the blood is surcharged with nitrogen. Unlike hysterical neuralgia, it is rather relieved than aggravated at the menstrual period. Morgagni refers to a case in which lithates were deposited in the mammae of a gouty patient. This I have never seen. Neuralgia of the head, nervous headache, or hemicrania, frequently depend on the circulation through the brain or its membranes, or the investing membrane of the skull, of blood which contains gouty impurities. The pain is commonly confined to the forehead or temples, and is complained of as if a nail were driven into one point, or a narrow sharp rim were compressing this part of the head. Light and sound are intolerable. Mental excitement

may run on almost to a state of hysterical delirium. This often ceases, as in hysteria, after free micturition, copious perspiration, or spontaneous diarrhoea, preceded by flatulence and loud borborygmi. There is no evidence of any inflammatory condition of the brain, and none of the moral contagion of hysteria. After frequent recurrence of such attacks the patient becomes low spirited, bursts into tears on the slightest annoyance, and is haunted by groundless fears, and dread of insanity.

Gouty affections of the *uterus* appear under various forms. When the attack is acute pains in the back are complained of as hot and *drawing*, not extending down the thighs, but round the hypogastric region. They are much increased at the menstruating period. The discharge is generally profuse, and leucorrhœa continues more or less during the intervals, slightly tinged with blood. If cold local applications be used to suppress the discharge the pain is greatly increased, and general feverishness supervenes. If this state continue it leads to hypertrophy of the uterus in the unmarried, to repeated abortion in the married. In the latter case gouty concretions have been

found on the surface of the placenta. These are much more frequently the cause of abortion in the early months of pregnancy than is generally believed, and I have no doubt that gouty metritis is the origin of very many organic affections of the uterus.

I have known some cases, and heard of many others, where the females of a family, the male members of which suffered from ordinary attacks of gout, have been subject to a kind of uterine catarrh, the leucorrhœal discharge being either thick and very irritating, or abundant and watery. Occasionally it consists of a milky gelatinous fluid, which, on drying, is converted into a sort of chalky paste, consisting principally of the phosphate of lime, with some carbonate of lime and ammonio-magnesia phosphate. This form is very common in Southern Europe, especially among English ladies who reside there. At times the quantity of earthy matter thus thrown off is quite extraordinary. I have been told of one lady who said she had passed enough to make her tombstone.

Pure gout very seldom shows itself in the joints of females, but one of the varieties of

rheumatic gout very commonly does so. The attacks come on at periods of life when uterine derangements are likely to occur, either at commencing puberty, after parturition, or at the decline of life. The smaller joints are affected, first by pain and aching, afterwards by redness, and there is sluggish action of the liver, denoted by duskiness of countenance, light coloured evacuations, and loaded urine. If not properly treated a chronic inflammation is set up in the articular extremities of the small bones, especially those of the fingers, and they become permanently enlarged, producing stiffness and very great distortion. The fingers are drawn outwards, and the ends of the metacarpal bones project prominently, as to form a very great deformity. This deformity being symmetrical, affects both extremities in a very similar manner.

## CHAPTER VI.

## THE NATURAL TREATMENT OF GOUT.

Diet, exercise, friction, habits of life, and climate, as preventive measures and remedial influences, in acute and chronic attacks of various kinds, and as means of retarding relapse.

PATIENTS often ask their medical attendants if there are any means of completely *curing* gout. The answer should be, that while we cannot cure gout by medicine, no disease can be more benefited by treatment, if the patient will honestly pursue a rational system of natural medicine. There are numerous facts on record proving that patients who have not suffered long enough from the disease to impair the vigour of their constitution very seriously, may, by means of regular active exercise, pure air, and wholesome diet, entirely

overcome all tendency to gout, and live to old age in perfect health. But if those who are unwilling or unable to take active exercise hope, by abstemious diet, to get rid of their sufferings, while they maintain their sedentary studious habits, and live in some confined situation, they will almost invariably be disappointed, and often aggravate the mischief by converting occasional fits of acute gout into prolonged sufferings, in the atonic or latent forms of the disease.

The general principles which should regulate the diet of gouty persons have been laid down in the first chapter, but it must be remembered that each case requires these principles to be carried into effect in an especial manner. Some patients will digest one dish well ; others cannot digest a sufficient quantity of one dish and must be allowed to dine from several. In either case, however, quantity and quality are of great importance.

There can be no doubt of the truth of the general principle, that vegetable food taxes the assimilating function more heavily than animal matters. Yet many stomachs which are irritated by any kind of animal food will

digest farinaceous articles readily, and some gouty patients have derived so much benefit from an exclusively vegetable diet, that pure vegetarianism has been strongly recommended by many as a general and prominent feature in the natural treatment of gout.

Every one who has the least knowledge of anatomy is aware that the whole apparatus for eating and digesting food in man, occupies an intermediate position between that in the carnivorous and herbivorous mammalia. It is generally inferred, from this arrangement, that man is clearly intended by nature for a mixed animal and vegetable diet. But it can scarcely be admissible to argue, that as man is neither intended to live on vegetable or animal food exclusively, therefore he should eat both. The vegetarians use the anatomical argument with more propriety when they infer that the food of man should be midway between flesh and herbs. They assert that the roots, fruits, and seeds of the earth, exactly supply the food which nature wants. Both parties, however, forget that man cooks his food—that he can neither live on raw flesh, raw potatoes, nor unprepared grain. The fact of cooking alters

the anatomical argument entirely, and it would not be difficult to prove that well-cooked flesh, fowl, and fish, sound potatoes, good bread, and ripe fruits, assisted in their mastication by the substitution of knives and forks for the teeth of the carnivora, furnish the exact intermediate food indicated by the conformation of the human species.

It must be remembered that the flesh of all animals usually eaten contains two crystallizable nitrogenous substances, kreatine and kreatinine, which are not found in wheat, peas, or any vegetable food, or even in milk or eggs. Kreatine is kreatinine combined with water, and thus rendered neutral in its relation to acids and alkalies. It resembles theine, the active principle of tea and coffee, and appears to act as a stimulus upon the nervous system. This would give some colour to the assertion that vegetable feeders are "mere digesters and flesh growers," and assist in proving that meat is necessary to those who do not want mere muscular strength, but desire perfect freedom and full activity of the whole nervous system.

Modern experience appears to be leading to the conclusion that the flesh-forming consti-

tuents of food should be principally taken from the animal kingdom, and the starch-like or heat-producing fuel from the vegetable world. Thus, when much meat is eaten bread should be used less, potatoes, other vegetables, fruit, and leaves, more ; and when bread is taken largely it should not be with, but as a substitute for beef and mutton.

It must be remembered that in different kinds of gout a totally different diet will be required. An active strong person with acute gout requires a very different diet from another whose stomach is enfeebled, and whose liver or kidneys are disordered. The abstemious vegetable regimen, which in the one case will be very beneficial, in the other will prove injurious or even dangerous. When a person has been accustomed to take stimulants freely, and the nervous system has suffered from their abuse, rules of strict abstinence prove very dangerous, while this abstinence is absolutely necessary in the early acute attacks of strong patients.

In no kind of gout can we expect to attain our object by a process of starvation, or by any

exclusive system, as by a diet purely vegetable, or a milk diet. Such systems may be advisable under some circumstances, for a short time, but if carried out to any great extent they almost always lead to disappointment, even though some temporary benefit follows their commencement. What we require is good wholesome mixed food, which the stomach can digest with ease, and which can be assimilated to form pure blood to nourish every part of the body.

Every case of gout will require its own especial rules of diet; but these rules must be framed from certain general principles, which we may shortly consider under the heads of prevention of gout in the children of gouty patients, and the treatment of acute and chronic attacks.

There can be no doubt that, even when hereditary predisposition to disease is very strong, perfect health may be generally secured by a careful attention to diet and other means of attaining vigour. The health of the offspring of gouty parents especially depends on their management during infancy and youth. A strong healthy wet-nurse during infancy, and

nourishment by pure milk alone for some months after weaning, are absolutely necessary.

If a child must be brought up by hand, milk alone is the diet to be recommended, and the nearest imitation of the milk of the human female is prepared by mixing two parts of ass's milk with one part of cow's milk. Ass's milk alone is rather more watery than human milk. Cow's milk alone contains too much butter, cheese, and salt, and is deficient in sugar. If ass's milk cannot be procured equal parts of cow's milk and warm water may be mixed together, and to each half pint of the mixture two teaspoonsful of sugar and a tablespoonful of cream should be added. This is the nearest approximation to human milk which can be obtained, where ass's milk is not to be had. At the age of eighteen months or two years bread and milk may be allowed, but the children must not be permitted to eat *too much* even of this. As childhood advances the plainest and simplest mixture of animal, farinaceous, and other vegetable food, must be given in sufficient but not immoderate quantity. Very pure water should be the only drink, alone or combined with milk. Hot

slops, tea and coffee, and those sweet and sour things which children are so apt to indulge in, should by all means be denied. The use of hot tea is especially injurious to young girls. It hurries onwards sexual development, and leads to irregularities in the menstrual function, which have an injurious effect on the general health. If these rules be attended to up to the age of puberty, and the other means of securing health be observed, as exercise, pure air, perfect cleanliness of the whole body, and sufficient clothing, so made as not to interfere with the movements of any part of the body, almost any child could escape even a very strong predisposition to gout.

Persons in vigorous manhood subject to, or threatened by, attacks of acute gout, with deposits of the lithates in the urine, will often derive great benefit from an exclusively farinaceous diet for some weeks, or a farinaceous diet with milk, but it must not be continued if it be followed by any loss of vigour or energy. It must be strongly impressed on gouty patients that the cause of their sufferings cannot be removed by any temporary change of habits, and that perseverance in an appropriate course

of natural treatment is absolutely necessary, if they desire so to remove the cause as to prevent any return of its effects. Thus, when a fit has passed off, and apparent health has been restored by careful regimen, it would be too much to expect permanent relief from the attention of a few days or weeks, if this attention is to be followed by a return to the habits which produced the first deviation from health. A strict adherence to necessary rules is richly repaid by future sound health, and the reward is surely great for what is only a sacrifice *at first*. It is only during the first few days that the want of any accustomed luxury is felt, and it will soon be found that a plain solid dinner, eaten with appetite, is far more enjoyed than the most elaborate dishes.

It is said that appetite is the best guide both to quality and quantity of food, but the appetite of gouty patients cannot be trusted. It is very variable. Sometimes it is quite wanting, and all food excites loathing; at other times the patient has what may almost be called fits of voracity—he is inclined to eat very rapidly without mastication. If this be not checked, every meal is followed by dyspepsia and flatu-

lence, and portions of food pass unchanged in the excrements. A great desire for spices, stimulating sauces, and highly flavoured condiments, if indulged in, lead to the same results.

As I am not writing a treatise on diet, all that I can do is to make a few general remarks on the different kinds of food constituting a healthy diet for the gouty.

*Animal food.*—Plainly cooked solid tender beef, mutton, or venison, and roast or boiled fowls, turkey, pheasant, partridge, or hare, form the most nourishing and digestible of all animal foods to an ordinary stomach. The flesh of young animals, lamb and veal, is less easily digested and less nutritious when digested. Pork, as a general rule, should be avoided, except in the form of bacon. Milk in various forms may be used, but it frequently disagrees with gouty persons. Its products, cream, butter, and cheese, must generally be used with much moderation. Conjoined with farinaceous substances, or made into light puddings with eggs and bread, it is often an excellent article of diet. In many cases of irritability of stomach, or obstinate vomiting,

milk, combined with lime-water, checks the sickness, and is borne by the stomach when scarcely anything else of a nourishing character would be. One part of lime-water may be taken with two or three parts of milk. The taste is not unpleasant. White-wine whey often becomes useful by keeping up the action of the skin. *Buttermilk* may often be taken when pure milk is not borne. New-laid, lightly boiled, or poached eggs, are generally well borne, but in some cases the white cannot be taken. The raw yolk beaten up with milk, or weak tea, is easily digested. Plainly cooked turtle is very nutritious and easily digested, but the rich soup should be carefully avoided. Well cooked fresh fish in season, without the addition of melted butter or sauces, especially the whiting, haddock, sole, cod, and turbot, are easily digestible and less stimulating than meat. They are less substantial, but are often useful when the digestive organs are unable to assimilate stronger food. Dried, salted, and pickled fish should be avoided—as should shellfish, except the oyster, which is often well borne by some in the raw state, by others when cooked ; but I have known some gouty

patients suffer greatly after eating raw cold oysters.

*Vegetable food.*—The fermented white bread in general use, even when unadulterated by alum, is not so good as the brown homemade household bread made from flour which is not freed from the cortical portion of the wheat grain. Hot rolls and new bread should be especially avoided. When fermented bread acidifies on the stomach, and gives rise to flatulence, as it sometimes does, biscuits well masticated may be taken, or the unfermented bread made by passing carbonic acid gas through the dough, instead of the gas formed by the decomposition of a portion of the dough under the influence of leaven or yeast. Panado, made by boiling bread until it becomes pulpy, and straining off the water, is often useful. Oatmeal is seldom borne in any form. Pearlbarley, well boiled, is often useful, especially in some meat broths. Well cooked rice, though much less nutritious than wheat, is light, digestible, and very useful, when there is any irritation of the stomach or bowels. Well made rice-water is an excellent drink. Peas, beans, and lentils, are seldom well borne

by the gouty, unless animal food be abstained from when they are taken. In that case, if very young, they are well borne, especially well boiled lentil gruel, or the white haricot. These leguminous seeds contain more nitrogen than the cereal grains. Nuts of all kinds are to be avoided.

The fleshy or succulent fruits, when fresh and thoroughly ripe, may generally be taken, in moderation, with advantage. Apples and pears should generally be cooked for the gouty. Ripe grapes, eaten of course without the seeds and skin, are often of great service to the gouty. They are slightly aperient, and often act freely as diuretics. I have known the grape cure, as carried on at Meran in the Tyrol, of great service in some old obstinate cases of gout. The orange and lemon are also very refreshing and useful. Indeed lemon juice has been strongly recommended as a medicine in rheumatism and rheumatic gout, chiefly on theoretical grounds. My own experience of its effects in practice is decidedly unfavourable, however useful the fruit may be in small quantities as an article of diet.

Potatoes, turnips, carrots, artichokes, &c.,

are important articles of vegetable diet. The nutritive power is not high, but when well cooked they are easily digested, and the vegetable acids they contain are useful. Asparagus acts as a slight diuretic, and is said to bring on fits of gout in those predisposed to it—and I believe not altogether without reason, as I have seen two cases in which it appeared to be the exciting cause of the attack. The green leaves of plants when eaten raw as salad, often disagree, but when cooked, as cabbage, brocoli, or spinach, may be allowed. Rhubarb stalks must be avoided, especially where there is any tendency to the formation of oxalate of lime. Mushrooms and other fungi should be forbidden, as they contain but little nutritive matter, and are very offensive to delicate stomachs.

While flesh or seeds supply the nitrogenous elements required by the waste of the body in the adult, and the waste and surplus growth in the young, the inorganic elements must also be supplied either in stems, roots, or leaves, or directly. Dr. Aldridge has shown that seeds and flesh are deficient in sulphur and the alkalies. The loss of sulphur in an adult of ten stone weight is about 20 grains daily, and 84

grains of potash and soda. "The quantity of wheaten flour requisite for supplying the waste of nitrogen and all the other elements, contains, however, but 17 grains of sulphur, and 43 grains of the alkalies. In a similar manner the weight of peas, in other respects sufficient for supplying the daily loss by waste, contains only 11 grains of sulphur and 55 of alkalies." (*Dublin Journal*, Aug. 1847.) The herbaceous parts of vegetables, while deficient in nitrogen, abound in mineral elements. The potatoe, he says, contains "in a bulk not too considerable, all the necessary elements for the supply of waste." (*Loc. cit.*)

*Drinks.*—Water is the basis of all drinks. About three-fourths of the whole human body consist of water. It is continually passing off by evaporation, secretion, and exhalation, and must be as continually restored. It dissolves many articles of food, and thus assists the stomach in the process of digestion, and contributes to various chemical changes which take place in the body. Very pure water is thus absolutely necessary for the preservation of perfect health. Water which contains earthy salts in considerable proportion, as the carbo-

nate or sulphate of lime, is not a good solvent of organic matter, and is therefore improper for gouty patients. Ordinary spring or river water, if it have passed through pipes, or is suspected to contain organic matter, should be very carefully filtered before used for drink.

A variety of simple diluent drinks, of which water is the principal ingredient, are useful in the sick room and for ordinary use—as toast-and-water, rice or barley-water, thin gum-water, and thin gruels of arrowroot, tapioca, or sago. When made thicker the latter are useful articles of carbonaceous diet. Tea and coffee owe their effects partly to the hot water with which they are taken, partly to the tannin and volatile oil they contain, and partly to their active base, *theine*. When a carbonaceous food is taken, it would appear from Liebig's observations, that theine yields the nitrogenized compound to bile. There can be no doubt that the free use of either hot tea or coffee, especially when taken with or soon after a meal, interferes most seriously with the process of digestion. When taken very strong they produce tremors, sleeplessness, and other nervous symptoms; but, as usually taken, the

chief harm they do is from the quantity of hot water taken with them, which dilutes the gastric juice and distends the stomach. Cocoa and chocolate generally disagree with the gouty, from the quantity of fat or oil they contain.

*Effervescent drinks* are often useful, especially when the stomach is irritable. Ordinary soda water alone, or combined with milk, is an excellent drink. I have known patients live many days on milk and soda water, with some biscuit, who could take nothing else of any kind without vomiting. Seltzer water is even more useful where an alkali is wanted.

Well made broths and soups, containing rice or macaroni, are better adapted for invalids unable to take solid food, than for the healthy.

The general principles upon which we should abstain from alcoholic drinks have been already explained, so that it is only necessary here to add that beer of all kinds is especially injurious to the gouty, and wine should only be used in cases where the general condition of the system, or of the digestive organs, show that a stimulus is required. Sweet and effervescent wines must be strictly prohibited. The Rhenish

wines are those which agree best with the gouty, as they never lead to deposits of lithic acid in the urine, and next to them the very dry sherries, called *Amontillado*, or *Vino di Pasto*.

When wine is taken, it must be observed that the general feeling of stimulation or cheerfulness produced should never exceed a perfectly comfortable or pleasurable excitement—that it should never be followed by sensations of drowsiness, lassitude, or depression of spirits, a heated skin, or increasing thirst. Morning headache, foul tongue, or disordered stomach, after taking wine in the evening, should certainly lead to its discontinuance at that hour. The effect of the complete abandonment of wine and spirits can be only determined by experiment in each individual case. In cases where it is necessary to assist the stomach in the digestion of food, it must be remarked, that it is possible for the stomach, under the stimulus of wine, to digest more food than is required by the wants of the system, and a state of unhealthy repletion then takes place.

Of the *condiments*, salt is the most necessary to life and health. It is an essential consti-

tuent of the blood, and of most parts of the body, and must be supplied in the food. It is calculated that about five ounces per week are required for the wants of the system. The earthy phosphates and the salts of potash, which are also required, are supplied in various kinds of animal and vegetable food. Vinegar in small quantities, is often useful, by rendering flesh more tender and more easily digested. Oil is seldom borne. Sugar is very apt to produce flatulence and acidity, and the various stimulating spices used, though gratifying to the palate, most frequently disagree with the stomach.

However the diet may be regulated, a few simple rules as to eating should always be borne in mind. 1. That while a spare or low diet is seldom either necessary or harmless to the gouty, the stomach should never be filled to an extent sufficient to cause any sensation of uneasy fulness. 2. That eating should always be sufficiently slow to admit of thorough mastication of food. 3. That solid food should not be taken with much fluid, it being better to drink freely between the meals. And, 4.

That neither mind nor body should be actively exercised very soon after a full meal.

If these simple rules were attended to, and at the same time a sufficient amount of exercise could be taken, pure air breathed and proper habits of life adopted, almost any kind of wholesome food might be assimilated, and the processes of nutrition would go on in a healthy manner.

The general principles upon which the necessity for *exercise* is founded, may be found from page 45 to 47. The amount and kind of exercise to be taken by gouty patients will of course vary with their strength and the state of the joints. Those who are able can scarcely take too much active exercise of any kind, so that it is kept within the bounds of fatigue. Walking, riding, rowing, fencing, and various games, as fives, tennis, rackets, &c., are all to be recommended to those who are able to enjoy them. Horse exercise is particularly beneficial when it can be borne, partly from the exhilarating effect of rapid motion on the spirits, but principally by the complete oxygenation of the blood it leads to, by the gentle exercise of voluntary inspiration it induces. Reading

aloud and singing, when not carried to excess, are most beneficial exercises, and can be practised by the most infirm. They tend to produce deep inspiration, equal expansion of the lungs, and give free access of air to the smaller divisions of the air passages, thereby decarbonizing the blood more rapidly. The lungs, diaphragm, and walls of the chest, are gently but freely exercised, and the air tubes are freed from obstruction. Like all other organs those of respiration acquire power by exercise, and that which at first produces breathlessness is soon performed almost unconsciously, and without fatigue. In all these cases, and in all gymnastic exercises, care must be taken not to hurry the circulation so as to produce either breathlessness or muscular fatigue.

It is of great importance that exercise should be taken in air as pure as can be reached by the patient. The Londoner should endeavour to evade the smoke, the countryman all low, marshy, damp places, and, while seeking the pure air of the hills, the invalid will of course seek the sun and avoid bleak places exposed to cutting winds. When carriage exercise is taken the vehicle should be entirely open, not

partially so, as cold is then apt to be taken from exposure to draughts.

Of all the forms of passive exercise friction is the most beneficial. Sir William Temple said, "No man need have the gout who can keep a slave to rub him;" and perhaps he did not greatly overrate the value of his favourite remedy. It was much employed by the ancients, whose attention was more directed than ours has been, until very lately, to the development of the muscular powers of the body, not only as a means of attaining bodily strength and agility, but in order to hasten convalescence after disease, to remove stiffness following wounds, injuries, or long confinement, and in the treatment of various constitutional diseases. But it has been too much neglected by the moderns, for I am convinced, by observation, that if well performed, persevered in for a considerable time, and applied systematically over the whole body, it may almost be made to supersede the necessity for exercise. It leads to very free circulation through the vessels of the skin, and an agreeable sensation of warmth which lasts many hours, and by equalizing the distribution of blood throughout the

body, and leading to free inspirations, tends to prevent local congestion and oxygenates the blood. Whether simple friction, or dry rubbing with the hand or some cloth of more or less roughness, be employed generally or locally, or some medicated friction, or inunction of medicated substances be used locally, one rule must be borne in mind, that is, never to employ it until after active inflammation has ceased.

The habits of life to be recommended to gouty patients in the intervals between attacks, are to rise early, to take a shower-bath, or be rubbed by a wet sheet, afterwards by a dry one immediately until warm ; then to take some gentle exercise in the room by dumb bells, or any motion of the limbs tending to expand the chest, and to drink freely of pure water. After dressing, wearing either flannel or wove silk next the skin, to take a plain solid breakfast. After this the ordinary occupations, or reading or writing, may be followed, but some exercise should be taken in the open air in the forenoon, and the principal meal of the day eaten about two in the afternoon. Occupation and gentle exercise again follow, and another meal should be taken about eight

in the evening, observing that the drink should be principally taken before breakfast and between the other meals, rather than at the time of eating. Tea or coffee should not be taken, or only in very small quantity, during the evening, as they tend to derange the stomach and prevent sound sleep. It does not do either to sleep on an empty stomach nor soon after a full, partially digested meal. The loaded stomach prevents the first sleep, or makes it heavy and unrefreshing, and the continuance of the digestive process causes restlessness in the middle of the night or early in the morning. The bed-room should be exceedingly well ventilated, and the free access of air must not be prevented by curtains around the bed. Some exit for the air returned from the lungs should be provided from the upper part of the room, by one of Dr. Arnott's ventilating valves, or in some other manner which does not admit currents of cold air. Sleep should not be indulged in too long. It is difficult to define the exact amount required, as individuals differ very much in this respect. We are all familiar with the evils arising from deficiency or excess of sleep, and are aware that habit has much to

do with the regulation of the necessary quantity, but cannot approach nearer the establishment of a general rule than to say, that six hours is the minimum and eight the maximum amount of time which should be passed in sleep. Its sudden interruption should be avoided as much as possible.

Perhaps nothing tends more pleasurably to restore health than change of air and travelling. The frequent change of scenery, without fatigue or sufficient hurry to excite feverishness, especially if combined with a short sea voyage, early hours, and regular varied exercise, have most beneficial effects both on mind and body. All this may sometimes be combined very advantageously with a more permanent change, and if the influence of a foreign climate can be obtained for some months, the intervals between the attacks are much lengthened, and the general health greatly improved. Of all the European climates which prove beneficial to the gouty, I am inclined to prefer Malaga, Rome, and Nice, the latter being more suitable where the affection is purely chronic, the two former where there is gastric irritability or feverishness. The climate of Malta is

also peculiarly useful, when a very marine atmosphere is not contraindicated, but above all others I consider that of Upper Egypt to be most likely to be generally useful. The air is so clear and dry—fog, mist, or rain, being almost unknown—the changes of temperature at certain hours of the day are so uniform, and so easily guarded against by change of clothing, and the atmospheric pressure is so equable, that a voyage of three or four winter months in a Nile boat is likely to be one of the most successful measures we can employ in the treatment of gout.

## CHAPTER VII.

## THE COLD WATER CURE.

Cases in which it is beneficial—In which injurious and dangerous—How pursued at a bathing establishment—How similar advantages may be obtained at the home of the patient.

THE “cold water cure” may be said to hold an intermediate place between the natural and medicinal treatment of disease. So much real good has undoubtedly been effected by it in many varieties of chronic disease, chronic gouty affections among others, that it becomes necessary for the medical man to throw aside all that prejudice and aversion to the system which is derived from the conviction, that it was originated by persons who had not received a medical education, and has without doubt been followed and practised by many persons with much quackery, and with but little

discrimination, as a general cure for all diseases, and with much abuse of regular medical practitioners. We must overlook all this, and with the sincere desire to seize all the good to be in any way obtained for our patients, examine what really can be effected by the scientific application of the various processes the professors of hydropathy have practised with more or less judgment, or with more or less ignorance and boldness. It cannot be doubted that they have brought under our notice various powerful means of modifying the vital actions and conditions of the whole body, means, if not previously unknown, which at least were generally neglected by the profession, and still remain so to a very considerable and perhaps blameable degree.

My object is simply to point out what experience has taught us may be gained from its application in cases of gout, and what classes of gouty patients may be benefited at regular hydropathic establishments; the precautions they should adopt there; and lastly, to show in what class of cases all the benefits to be obtained at one of these establishments may be gained with less inconvenience, and perhaps

with more safety, at the house of the patient, under the direction of his usual medical attendant. I may state, that the conclusions I have arrived at, have been formed after visiting some of the best conducted establishments in Germany, residing for two months at Malvern, and carefully observing the effects of the treatment adopted there.

The principal means of determining whether a gouty patient is likely to be benefited by the water cure, and what particular form of hydropathic treatment should be adopted, consist in observing whether any acute attack is threatened or impending, whether the general febrile excitement which is apt to usher in an attack is present or approaching, and if this be not the case, and the patient is in a purely chronic condition, to observe what power of resisting cold, and reacting after shock, remains in the system. In the former case, that is to say, if any symptoms of acute gout, or gouty febrile excitement, are present or threatened, any form of hydropathic treatment would, I believe, prove extremely dangerous, and be very apt to cause a translation of the morbid action to some internal organ. I say this, although

I have seen an attack of acute gout terminate favourably at Malvern under hydropathic treatment only, but I felt convinced that the attack lasted longer, and that the sufferings of the patient were far greater than if he had undergone ordinary medical treatment. The hydropathists would reply to this, that the patient is left in a better state, and with less liability to relapse, than after ordinary treatment, but this is very doubtful. In the fourth volume of the *Medical Transactions*, Dr. Haygarth relates two cases in which death was produced from simply putting the feet into cold water during an attack of gout, the heart being the organ which became the subject of the internal disease. I have also seen a very severe attack of gout in the stomach produced by similar imprudence, and believe the conclusion to be a sound one, that all acute symptoms and febrile action should be subdued before any gouty patient is subjected to hydropathic treatment. Then, in the purely chronic cases, the benefit to be derived will vary greatly, according to the form of the disease and the amount of general constitutional depression which it has produced. No better test of this degree of depres-

sion can probably be obtained than that of Priessnitz, by sprinkling or dashing over the surface of the body with cold water, and watching the rapidity with which reaction takes place. In this way a tolerably correct opinion can be formed of the general powers of the system, by watching how its power of resisting cold is developed ; but considerable caution must be exercised in making the first trials upon a patient who is evidently weak. If the power of resisting cold be small, as shown by general chilliness after the sprinkling or dashing, still more so if after a cold plunge no general glow is produced over the body by moderate friction, hydropathic treatment would be invariably injurious or dangerous, and should by no means be commenced until other means have been successfully adopted for restoring the lost powers of the system to such a point that reaction comes on after the shock of sudden cold. In the same way when the deposit of the phosphates in the urine, or about the joints, evince a similar low condition of general power, in which cases reaction is sometimes evidenced, but is generally transient, partial, and soon succeeded by chill, hydropathic

treatment must not be commenced until, by the use of acids, Rhenish wines, and generous diet, the composition of the blood is altered.

The question now arises, supposing no acute attack be present or threatened, that the case is purely chronic, and that general and permanent reaction is soon set up after a cold plunge or moderate friction, what form of hydropathy should be followed ? Should the patient go to a foreign or English bathing establishment, or should he practise hydropathy at home ? This is a question frequently put by patients, and the answer will depend very much upon their peculiar engagements and domestic affairs. If any one can, without great inconvenience, without inducing mental anxiety by absence from important concerns or near relations, absent himself completely from all the causes which have contributed to bring on his disease, from temptations to luxurious living and sedentary habits, from too great mental exertion, from the toils of the senate, committee, bar, pulpit, or exchange,—if he can thus effect a perfect change in all his habits of life, go to a strange country or district among new faces and fine scenery, where he will find interest without excitement,

be induced to take active exercise, if not incapable of doing so, and in the latter case be subjected to the best applications of passive exercise (although it is rare that sawing or chopping wood, or some form of gymnastic exercise may not be practised, when walking or riding on horseback are impracticable), where perspiration and bathing will promote free excretion from the skin, and draughts of cold water will dissolve and carry off morbid matters from the blood, and provoke a natural appetite for natural food ; when he leaves off a system of drugging which has often been injurious, and where confidence in a new system induces hope and cheerfulness, there can be little doubt that, under a skilful and cautious adviser, such a proceeding would be the one of all others, most likely to effect a rapid restoration of health and strength.

There are certain cautions, however, which must be observed in all these establishments, the principal of which is not to "overdo the cure," as many are apt to do. A few glasses of cold water daily are useful and necessary, especially where sweating is profuse, but the enormous quantities some persons are induced

to swallow are never necessary, and must prove more or less injurious. Again, one cold bath daily, or the application of the douche or wet compress, is generally followed by tolerably permanent reaction, a disposition for exercise and good appetite ; but if these baths, douches, or compresses, become the business of the day, the powers of the system are overtaxed, debility is produced, reaction becomes more feeble, and the patient returns home in a worse condition than before he left. The grand object is to produce just so much cooling of the body as shall call the heat-producing function of the lungs into activity, and thus burn up, not only all the superfluous carbonized matter in the system, but such a proportion of the vital tissues as shall lead to a necessity for their repair by newly deposited nutritive matter, and a necessity for the supply of this matter by the digestive organs. But this must not be overdone, or weak digestive organs will be unable to supply loss, and the process of animal combustion will be performed very imperfectly and at the expense of the organic tissues. In moderation the same means which strengthen

and renew the powers of the constitution, in excess impair or destroy them.

Again, the frictions and other purely local means of modifying the conditions of diseased joints, &c., which in moderation are highly useful, when excessive, are both to be followed by inflammatory action, an acute attack, and certain mischief.

Of all the different applications of hydro-pathic methods to chronic gouty patients, I am disposed to think the safest and most generally useful are the wet sheets as a means of affecting the system generally, and the wet compress as a local application. The wet sheet may be either used to produce simple reaction immediately on rising in the morning, or as a means of inducing continuous perspiration. In the former case the sheet is wetted with cold water and thrown over the patient, rubbed upon him for a few seconds, active friction being afterwards employed with a rough dry towel. The person should then take some exercise, followed by breakfast. When perspiration is desired the wet sheet is covered over the body, several blankets are folded over all,

probably an eider-down cushion thrown over this, and the person lies, for half an hour to an hour, taking cold water at intervals. It is common to take a cold bath after this, but I believe dry friction to be far safer and equally beneficial in gouty cases. The quantity of matter thrown off from the system in an hour in this manner, is really surprising. It consists of water holding various salts and animal matter in solution. It is sometimes sufficiently acid to reddens litmus paper, and in gouty cases probably very much resembles the analysis quoted by Dr. Simon, which may be seen at page 49. It is quite clear that as notwithstanding the large quantity of liquid daily lost by perspiration thus induced, the body maintains or gains upon its former weight, that new matter is deposited in proportion, or in a larger proportion than that removed.

The wet compress may be used to effect two different objects, either to produce cold and subdue inflammatory action, or to serve as a sort of fomentation, relaxing the vessels of the part, opening the pores of the skin, and thus acting upon the part as the wet sheet does upon the whole body. The cold effect is pro-

duced by repeatedly changing the wet bandage as often as it becomes warm, and in this form should be strictly avoided in all cases of gout. In the other case the wet bandage is placed over the part, which is then covered by a piece of oiled silk or india-rubber cloth, and a flannel wrapper. The wet cloth very soon becomes warm and acts as a fomentation, often proving of great service, relieving the loaded vessels of a part, and allaying pain.

The sitting-bath, shower-bath, and general douche, are seldom necessary or proper in gouty cases, but the local douche is often extremely useful.

The quantity of cold water taken internally I should be disposed to leave entirely to the instinct of the patient, rather encouraging him, however, to drink freely whenever he felt disposed to do so, with the view of dissolving or diluting the saline or other injurious matters which exist in the blood in gouty cases, and then carrying them off by the kidneys and skin. When so much water is taken that it begins to be discharged from the mucous membrane of the intestines, it is time to check the quantity taken; the object being to promote

free excretions without the derangement of the excreting organs. Thus, diarrhoea when it comes on, goes off spontaneously on the supply of water being diminished.

Now the bath, the douche, the wet sheet, and the wet bandage, the diet, the draughts of cold water, the exercise, the friction, can all be carried on at the house of the patient under competent medical guidance, as well and often more conveniently than in any hydropathic establishment. All that is wanting to secure their equal efficacy is good will on the part of the patient, his understanding of the principles upon which the different methods are used, pure air, cheerful society, absence from all domestic troubles or cares, and anxieties of all kinds. That all this may be as readily obtained at home by our wealthier classes as in any hydropathic establishment, and even much more so, is so evident that it scarcely requires remark.

## CHAPTER VIII.

THE MEDICINAL TREATMENT OF GOUT AND ITS  
COMPLICATIONS.

Bleeding, purgatives, sudorifics, diuretics, chemical solvents, tonics, mineral waters, specific remedies—Treatment of an ordinary attack, of cases complicated with rheumatism or syphilis, and of various irregular forms in the male and female: the cerebral, nervous, cardiac, pulmonary, gastric, renal, vesical, and uterine complications.

BLEEDING has of late years almost entirely been discontinued in the treatment of gout, but the practice of small bleedings has been recently advocated by Dr. Gairdner. He speaks very highly of their use in cases of plethoric persons, taking only from three to six ounces of blood. But notwithstanding all he says in their favour, it is very doubtful whether the small quantity removed can make any sensible

alteration in what he considers to be a "condition of vascular plenitude." Even if such a condition be present, it is probable that a free diaphoresis or diuresis would make a much greater alteration and far more safely. Perhaps it might be useful in a case where it was of great importance to afford temporary relief immediately, but I have never been obliged to have recourse to it; and when I have taken some three or four ounces to obtain information as to the state of the blood, I have generally found cause to regret having done so. Indeed, I never saw a gouty patient who bore the loss of blood well, but very many who have been injured very seriously by it.

*Purgatives* are often necessary, but they must be used with great caution. In many cases it is absolutely necessary to have the bowels cleared from irritating substances, but this must not be done by drastics or saline purgatives. A dose of blue pill and colocynth, or calomel and colocynth with a little morphine, or decoction of aloes, or rhubarb and magnesia with ginger, preceded or followed by an enema of simple warm water, or barley-water, with the addition of a little castor oil,

or an ounce or two of olive oil, will answer every purpose. When the bowels between the attacks are not regularly open, two simple pills may be given, two or three times a week, at bed-time, containing half a grain or a grain of ipecacuanha, from three to six grains of compound rhubarb pill, and about five grains of Castile soap, with or without a grain or two of blue pill, according to the state of the liver. But this will become unnecessary if the diet be properly regulated and diluents are taken freely.

The action of *sudorifics* has a most powerful curative effect in gout, but it is an action which can scarcely ever be attained by mere medicine with any certainty ; and, when perspiration is so attained, the beneficial effects are not nearly so great as when it is produced by more natural measures. Whether we give opium alone, or combined with some antimonial preparation, or with ipecacuanha, and these are really the only sudorific medicines upon which anything like reliance can be placed, the action on the skin is very uncertain, unless it be assisted by the free use of diluents and the application of external warmth, measures

which are alone capable of exciting free perspiration. Unless, therefore, there be something in the state of the circulation, or in the condition of the nervous system, indicating the propriety of giving antimony or opium, alone or in combination, I am inclined always to trust to the use of diluents or of external measures, to induce perspiration.

Of all these external measures the hot-air or vapour-bath is the most effectual and the most generally useful. Either of these promote extraordinary free perspiration, and thus directly free the blood from a large quantity of fluid, with animal and saline matter (see pp. 48 to 52), and by leading to a free circulation of blood through the capillary vessels of the skin all over the body, unload the vessels of the internal organs, and thus promote their free secretion.

The simplest and most effectual manner of making the hot-air bath is to fold a blanket over the seat of a common wooden chair and let the patient sit on it. He is then covered by five or six blankets, which are tucked closely round his neck, and fall round the chair on to the floor like a cloak. An ounce or two of

spirits of wine is then put into a small saucer, or the top of a cold cream pot answers very well. This is placed beneath the seat of the chair on the floor and lighted. In from ten to fifteen minutes the person is generally in a profuse perspiration. If any fulness of the vessels of the temples come on without perspiration on the forehead, the burning spirit should be removed ; and the same may be said if any unpleasant fulness is complained of about the head. When the perspiration runs freely down the sides of the body, so that the patient feels his hands well moistened as he passes them over the ribs, the effect is sufficient, as it is not desirable to carry it on to the extent of producing depression of the system.

In some cases where it is desirable to give such a bath once or twice a week, in the intervals between attacks of gout to prevent their recurrence, it is well to do it in the morning, and have the body well rubbed over afterwards, first with a wet sheet and then with a dry one, to procure a healthy state of skin and prevent a chill being felt. When it is given during or at the commencement of an attack, to relieve this attack, the wet sheet should not be used,

but the patient should go at once to bed in warm dry linen, drink simple diluents freely, and let the natural perspiration continue. In this way I have seen very acute attacks of gout go off very speedily, without any medicine whatever being taken beyond a simple dose of magnesia.

The vapour-bath may be given in a similar manner, substituting for the burning spirit a pail of water beneath the chair in which a hot brick, or the hot iron from an urn, is immersed. Or the steam from boiling water may be conveyed by a pipe from a kettle to the bed, or sofa, on which the patient lies enveloped in blankets.

When a patient cannot sit he may lie on a sofa covered with blankets, which are raised by a wooden frame or cradle, and a spirit lamp, protected by a frame-work of wire gauze, is placed beneath it. The effect is much the same, but the chair is to be preferred.

The method of producing perspiration by enveloping the patient in a wet sheet, and then covering him with blankets, described in the last chapter, is sometimes useful, but must be employed with great caution. When there is

much fever present it is a very effectual means of lowering it, and under these circumstances is to be recommended, but it is far too debilitating to be frequently used in cases of gout.

*Diuretics* have long been considered as the most uncertain of all remedies in their action, but Dr. Golding Bird has shown most ably, in the last edition of his work on *Urinary Deposits*, that we can predict, in almost every case, "from the knowledge of a few general laws, what will really be the effect of a medicine destined to act upon the kidneys." These laws are, First: "All the essential agents intended to reach the kidneys must either be in solution when administered, or capable of being dissolved in the fluids contained in the stomach or small intestines, after being swallowed. Second: Bodies intended to reach the kidneys must, to ensure their absorption, have their solutions so diluted as to be of considerable lower density than either the liquor sanguinis, or serum of blood (*i. e.* below 1.028.") Third (this is quoted from Dr. Barlow): "If a sufficient quantity of water cannot be received into the small intestines, or the circuit through the portal system in the vena cava ascendens, or

thence through the lungs and heart into the systemic circulation, be obstructed, or if there be extensive disorganization of the kidneys, the due secretion of urine cannot be effected."

I quite agree with Dr. Golding Bird in his opinion, that the supposed uncertain effects of diuretics may be explained by one of these laws, and traced rather "to a want of discrimination on the part of the practitioner than to any fault in the remedy." This is much to be regretted, for assuredly diuretics are among the most important means of depurating the blood in any disease, and especially so in gout, by pumping off, or cleansing away from the blood, the products of metamorphosis of tissue, which if allowed to remain must lead to disease or death.

In the administration of diuretics it is most important that the second law should be acted upon. Saline remedies which given in very dilute solution act certainly and readily as diuretics, when given in stronger solution act as purgatives, and rather diminish than increase the passage of water through the kidneys. This explains the different action of the natural mineral waters from that of the salts

they contain when given in a more concentrated form, and shows that salines should not be given in a solution containing more than 5 per cent. of the salt, and that the dose should be followed by a free draught of pure water.

In many cases of gout, where the liver is sluggish and the portal circulation congested, the only efficient diuretics are those which produce a free secretion of bile, and thus relieve the congestion. In these cases a dose of blue-pill and aloes, taraxacum with bitartrate of potass, or a full dose of colchicum, are the only diuretics which can be depended on.

Dr. Golding Bird has also shown that while some diuretics act by increasing the quantity of *water* discharged by the kidneys, others "increase the *excretion of solids* from the blood;" and he explains this by the beautiful researches of Mr. Bowman, enabling us "to suggest a probable physiological solution of this curious fact, by supposing that the vascular tufts of the kidneys are especially stimulated by one series of diuretics to induce the exudation of more water from the blood, whilst the other series especially increase the formation of epithelial structure." (*Op. cit.* p. 427.)

The one class of remedies are *renal hydragogues*, the other renal, or rather blood, *depurants*.

The renal hydragogues which have no chemical effect on animal matter out of the body, as cantharides, squill, juniper, copaiba, &c., are only useful in increasing the excretion of water. They do not increase the quantity of solids cleared off from the blood by the kidneys, and they are, therefore, only useful in gouty patients in very exceptional cases. It is to the blood depurants that we have to trust, and the most useful are the acetates, tartrates, and citrates of potass and soda.

Dr. Golding Bird has shown how very effectual the acetate of potass is as a blood depurant. He gives the case of a young lady whose urine was collected for twenty-four hours, and examined when no medicine had been given ; and, on another day, after three drachms of this salt had been taken during the twenty-four hours ; the result being that “the solids of the urine, separated from the blood under the influence of this chemical diuretic, exceed those excreted without its aid by 190 grains.” (*Op. cit.* p. 431.) The action is of course as-

sisted by free draughts of water, for it has been shown by Becquerel, that excess of water does not escape from the kidneys alone, but always carries with it more or less solid matter. Thus, in cases of chronic gout, and in some of the various combinations of chronic gout and rheumatism together, acetate of potass given largely diluted in quantities of from two to four drachms in twenty-four hours, becomes a most valuable medicine. It must not be continued, however, after any symptoms of debility appear, or indeed longer than the patient feels decidedly better, stronger, and more lively during its continuance. The citrates and tartrates of potass and soda are also useful, but are apt to act too much on the bowels, even when given in a very dilute form. They all act in the same manner, provided the digestive powers be unimpaired, as they are then decomposed, and carbonates of the different bases enter the circulation. The bitartrate of potass in the Rhenish wines, and the citrates and malates in apples, strawberries, and currants, act in the same way.

*Chemical solvents* are also very important remedies in gout. The solvents of lithic acid,

or those which render it solvent by converting it into the lithates of potass or soda, may be occasionally required and used as palliatives, while we are endeavouring to remove the state of system on which the formation depends. The Vichy water, or the artificial substitute made by Dr. Struve, is the best form for administering them; half a pint being taken early in the morning, and again an hour or two before dinner. The liquor potassæ is less useful than the carbonates of potass or soda. Dr. Golding Bird recommends half a drachm of bicarbonate of potass three times a day, with five grains of citric acid, which is just enough to render the solution sparkling. The patient should use diluents freely at the same time, to assist in the solution of the lithic acid.

No means of rendering the urine alkaline, however, can be persevered in without injuring the general health, leading to muscular debility, or to a tendency to the formation of other urinary deposits. The borate of potass is strongly recommended by M. Bouchardat as a solvent of lithic acid. He gives fifteen grains in a tumbler of water several times daily. It is said to be less injurious than the alkaline

salts just recommended, but I have had no experience of the results of its use. The phosphate of soda is another powerful solvent of lithic acid. It may be given in doses of a scruple or half a drachm freely diluted. It even lessens the pain, and allays the feeling of general irritation during an acute attack, and after the attack has gone off, promotes convalescence. The phosphate of ammonia, recommended by Dr. Buckler, of Baltimore, in doses of ten grains three times a day, has been tried by Dr. Golding Bird. He says, "It has always succeeded in keeping uric acid in solution in the urine, and in this respect, it has appeared to be at least equal, if not superior to borax and phosphate of soda, but I certainly have never seen it diminish the tophaceous deposits of chronic gout. In more recent effusion in the joints, in the subacute forms of rheumatic gout, it has certainly been of service." I have, however, heard of very unpleasant symptoms following its use. Benzoic acid and benzoate of ammonia have been used with advantage, but Mr. Ure has not established his proposition that the benzoates are useful by converting insoluble lithic into soluble hippuric acid. The benzoate

of ammonia is the most useful, as it has a decided tendency to promote perspiration. It is easily given by prescribing five grains of benzoic acid with an equal quantity of sesquicarbonate of ammonia, to be dissolved in two ounces of boiling water, and taken three times a day with a little syrup. But of all chemical solvents, I am disposed to regard the iodide of potassium as the most useful, as it has so great a solvent power on the lithate of soda, which is the most common impurity in the blood of gouty patients. A concentrated solution of the iodide dissolves the lithate of soda very readily out of the body, and to a much greater extent when the lithate is recently prepared and the solution is warm, but it has very little power of dissolving pure lithic acid. I have given it very extensively for the last thirteen years in almost all forms of gout, except during the acute attack, and in almost every case with the most encouraging results. I have tried it in doses from eight grains three times a day to one grain daily in divided doses. I have had patients who have continued the latter small dose for several months, and after carefully watching the effects of discontinuing its

use and returning to it, I have been convinced, that the improvement in health which accompanied and followed its use, was really connected with, or dependent on, the use of even so small a quantity. It clearly affects the blood, for it may be detected in the urine, and I can only suppose that it must tend to keep small quantities of lithate of soda formed in the blood in a state of solution, although it is, I confess, difficult to see how so very small a quantity could act upon a sufficient quantity of lithate of soda to make any appreciable alteration in the condition of the blood. However this may be, the good effects are too uniform to leave any doubt as to the value of the remedy, of which I shall say more in the next Chapter.

*Tonics* become occasionally of great use in the later stages of chronic gout. I have seen great benefit result from the use of the citrate of iron and quinine, in doses of five grains three times a day, or five grains of the citrate of iron in an effervescing draught, with carbonate of ammonia and lemon juice. The former preparation is particularly useful in old people when the action of the heart is feeble and irre-

gular. Dr. Gairdner speaks highly of the saccharine carbonate of the Edinburgh Pharmacopœia in these cases, given in doses of five or ten grains twice a day in some aromatic water.

*Mineral waters* partake of the characters of the last three classes of remedies, and must be regarded as diuretics and blood depurants, chemical solvents, and tonics, some of them having also a purgative action. Those most in repute in this country in gouty cases are those of Bath, Buxton, Tunbridge Wells, and Cheltenham. Those abroad Vichy, Ems, Wiesbaden, Aix-la-Chapelle, Carlsbad, Marienbad, and Langen Schwalbach. The Vichy waters are the most useful when the lithic acid diathesis is a prominent characteristic of the patient ; those of Ems, Carlsbad, and Wiesbaden, in cases where a soothing effect upon the digestive organs and general system is required, as a preparation to a course of other waters. In the atonic forms of gout with debility, the Pauline spring at Langen Schwalbach is one of the best. In this country the Tunbridge Wells waters are well adapted to these cases. In the treatment of the local affections of joints, bathing and the

application of the douche at Aix-la-Chapelle, Wiesbaden, or Bath, are very useful in lessening the stiffness and swelling.

The following caution of Sir James Clark should be borne in mind before prescribing a course of mineral waters in gout : " It should be ascertained, that the heart and large vessels are in a sound state, and also that there is no disposition to cerebral congestion. The neglect of this precaution may lead to fatal effects." (*On Climate*, p. 370.) When a patient cannot take these waters at their source, the artificial imitations of Dr. Struve are excellent substitutes.

Of all the *specific remedies* which have been vaunted as cures for gout *colchicum* alone claims notice. There can be no doubt that this drug really has a specific power over the disease, and that it not only relieves the pain and inflammation which accompany an acute attack in a joint, but that it also removes the symptoms of the disease in other parts of the body. This relief is certainly not procured, as many have supposed, in consequence of some sensible effect, as vomiting or purging. In the cases in which it is most useful the pain is relieved and the

general irritation removed without any other perceptible effect. In large doses it certainly produces vomiting and purging, but this only shows that the system is engaged in throwing off something noxious, irritating, or poisonous ; a process which is not at all necessary when the drug is not given in excess, but only in such quantity as may remain in the blood and exert specific action without causing any of the irritating effects of a larger or poisonous dose. The fear that the relief colchicum affords is only obtained at the risk of future increase of disease and of the irregular or internal affections of which the gouty eventually die, has doubtless arisen from the use of large doses, which really have a most injurious effect, by lowering all the powers of the system, and is well founded if such doses be given, but is altogether groundless if the remedy be used in doses small enough to afford relief without producing any other effect.

The question, *how* does colchicum relieve gout ? is now approaching a satisfactory conclusion ; for although we cannot say whether it exerts its influence by modifying the condition of the blood or the nervous system pri-

marily, it is an ascertained fact that it effects a change in the nitrogenized products which are in excess in the blood, and assists in removing them from the system through the kidneys. Chelius first drew attention to the fact, in the *Heidelberg Klinische Annalen*, that in some cases of gout and rheumatism colchicum increases the quantity of lithic acid in the urine. In one case this quantity was doubled in twelve days. Dr. Graves afterwards pointed out that this effect was not certain in rheumatism, but that, on the contrary, the quantity of the lithates in the urine diminished under its use: and he argued, that it rather tended to prevent the formation of lithic acid in the blood than to assist its elimination in the urine. More recent investigation leads to the conclusion that, in gout, although colchicum diminishes the quantity of lithic acid and the lithates in the urine, yet that it leads to a greatly increased discharge of urea, and that its beneficial action depends upon a power it possesses of so modifying the chemical changes which go on during the assimilation of nutriment and the metamorphosis of tissue, that any excess of nitrogen present is thrown

off as soluble urea, instead of as insoluble lithic acid, or as lithate of soda.

The preparations of colchicum in ordinary use are obtained from the cormus and the seeds. A powder of either is sometimes used, but is not to be recommended, as the strength varies very much with the age of the powder, and the properties of the plant are altered by drying. Any of the tinctures, acids, or vinegars, prepared from the cormus are also very uncertain in the amount of their action. The colleges order the fresh cormus to be used, but as this cannot be procured at all seasons of the year, the druggists generally use the dried, making various allowances for loss of weight by drying. Thus some specimens of the tincture contain more than double the quantity of the active principle of colchicum than others. The acetum colchici of the pharmacopœias is a solution of acetate of colchicine, varying in strength like the other preparations of the cormus. When given with magnesia the colchicine is liberated from the acetic acid, and is said to be a very efficient medicine; but for many years past I have only administered colchicum in two forms: the one the extractum

colchici aceticum of the Pharmacopœia, which contains the acetate of colchicine, and forms a very useful pill in combination with blue pill and compound extract of colocynth ; the other, a preparation which is much less known, but which I believe to be by far the best preparation of colchicum, namely, the tincture of the flowers. Sir James Clark first made me acquainted with the value of this tincture, which was introduced into practice by Dr. Jones, Physician to the late Duke of York. If prepared from the fresh flowers it must be of nearly uniform strength, varying only with the different degree of moisture of the flowers in different seasons. This variation is quite appreciable, and it is certain that for the last two years rather a larger dose than usual has been required, owing to the wet weather which preceded the period of gathering the flowers ; but when this is known the action is very uniform. It is much less likely to cause sickness, depression, or purging, and is much more certainly successful in relieving the local pain and general irritation than any preparation of these seeds or cormi. Half a drachm is the largest dose I have ever given, and I seldom exceed ten

minims every three or four hours in an acute attack, or the same dose two or three times a day under more chronic conditions. I have given one drop only three times a day for some weeks in succession, and the patients have improved wonderfully while taking it, I believe from the effects of even this small dose, although I admit it would be exceedingly difficult to prove the relation between the remedy and the improvement. In some of the most successful cases which have fallen under my care, I have attributed much of the benefit derived to the long continuance of these very minute doses with equally small quantities of the iodide of potassium. One grain of the iodide divided into three doses, and given with one drop of the tincture of the flowers of colchicum three times a day, I believe to be a remedy which has very considerable power in modifying the chemical changes which take place during the assimilation of nutriment and metamorphosis of tissue in the gouty, and in so modifying them as to prevent the formation of those compounds of lithic acid, which, by accumulating in the blood, constitute the essential element of the disease. I should

state, that Mr. Squire, of Oxford Street, prepares the tincture of the flowers every year with very great care.

Having entered so fully into the consideration of the general principles upon which gout should be treated, and the application of various methods of treatment, it will not be necessary to say more than a very few words respecting the application of those principles to the circumstances of different cases.

In treating an ordinary acute attack, the chief points to be observed are to keep the patient quiet and comfortably warm, with the affected limb elevated; to clear the stomach and bowels from any irritating matter; to diminish the supply of nitrogenized food by feeding the patient chiefly on arrowroot, sago, or rice; to give diluent drinks freely with the acetates or citrates of potass or soda, and to obtain a free action from the skin by means of the vapour bath. Almost any attack will go off under this treatment, but the cure may be hastened by giving small doses of colchicum—as ten or fifteen minims of the tincture of the flowers every four hours. I do not place much faith

in any local treatment during an acute attack, and am accustomed simply to wrap up the joint in cotton wool, although I have occasionally found that lint wetted with laudanum, applied over the painful part, and covered with oiled silk, seemed to give relief, and I have also seen temporary diminution of pain follow assiduous fomentation with hot water, a decoction of poppies, or with an alkaline solution. After the attack has gone off, a quiet holiday in the country should be enjoyed if possible, a simple nourishing diet allowed, and sufficient exercise taken.

In the more chronic attacks the treatment must be chiefly constitutional. If the lithic acid diathesis be present, and the bodily powers be not much impaired, diluents with the acetates and citrates, Vichy water, and strict diet, are indicated. If the system be depressed, five or ten grains of the citrate of iron, given after each meal, prove very useful, and very small doses of colchicum, two drops for instance, may be given at the same time for some weeks, with very great advantage, the action of the skin being kept up by vapour baths and friction.

When the oxalates are present in the urine

the treatment should consist in tepid shower baths, followed by friction, warm clothing, simple nutritious food, the free use of pure soft water as a diluent, and small doses of nitromuriatic acid with morphine. In females, when leucorrhœa is also present, the citrate of iron is particularly beneficial. Small doses of colchicum with morphine, as three drops of the tincture of the flowers with five drops of the solution of bimeconate of morphia, three times a day, effect rapid and remarkable improvement, in cases where the local symptoms are prominent. Under the use of this latter combination I have seen the oxalates give place to the lithates in three days.

When the phosphates exist in the urine, the system must be well supported by nourishing diet and Rhenish wines, and the state of the skin must be carefully attended to. The most useful medicine is a combination of phosphoric acid and morphine, giving from ten to twenty minims of the diluted acid of the London Pharmacopœia, with equal doses of the solution of bimeconate of morphia. In some cases I have given the acid alone very freely as a beverage, acidulating raspberry

syrup with it, and allowing the patient to drink *ad libitum*. The result has been very satisfactory.

In the treatment of the various combinations of gout and rheumatism, great judgment is required to meet the prevailing type of disease, and obviate the dangers to which either may lead. When acute rheumatism attacks those subject to acute or chronic gout, the rheumatic attack must be first attended to, and the state of the heart carefully watched. In such cases I trust to the free use of alkalies, warm baths containing two or three ounces of carbonate of soda, as recommended by Dr. Wright of Birmingham, and opium. When acute gout complicates chronic rheumatism, the gouty attack must first be relieved. In attacks of synovial rheumatism, the tendency to cerebral complication and iritis must be carefully watched. Proper constitutional treatment must be adopted, while leeching, cupping, and blistering are employed around the affected joint until all inflammation is subdued, when, painting with tincture of iodine, bandaging, and friction become useful. In any of the cases of rheumatic gout affecting joints, the alkaline and opiate

fomentation recommended by Dr. Fuller to allay the pain of rheumatic inflammation, proves very useful. An ounce of carbonate of potass may be dissolved in half a pint of decoction of poppies, or of rose-water, adding half an ounce, or six drachms of laudanum, or Battley's sedative solution. Spongio piline wetted with this fomentation may be wrapped round the joint, or fine flannel soaked in it may be applied in the same way, and covered with oiled silk, or india-rubber cloth. The sulphuretted bath also proves useful, whether employed at a natural spring, or the substitute recommended by Planche and Boullay be used. This is prepared as follows: Sulphuret of soda or potass, three ounces; carbonate of soda, two drachms; chloride of sodium, two drachms; sulphate of soda, one ounce; water one pint. Mix, and add the solution to twenty gallons of water, at a temperature of 98° Fahrenheit. In cases of sciatica, or neuralgia, constitutional remedies are assisted by acupuncturation of the affected nerve, by electricity, and by the local application of alcoholic solutions or ointments, containing veratria or aconite, a scruple of the former, or eight grains of the latter, to an ounce

of spirit or simple ointment, or by the use of chloroform liniments diluted with oil and rubbed in, or poured over lint which is laid on the part, and covered to prevent evaporation.

In each and all of the complications of gout with syphilis, the iodide of potassium is the grand remedy. The constitutional forms will generally require support by nourishing diet and wine, and the iodide may be given freely, as in doses of eight grains three times a day.

In any case of severe, or apparently severe, disease of any organ of the head, chest, or abdomen, which appears in a gouty person, whether it be considered as an effect of metathesis or not, the greatest caution and decision are required. Two errors are very liable to be committed. The most frequent, is that of regarding the really frightful symptoms as indications of acute inflammation, and treating them accordingly ; the other, is that of disregarding signs of real danger, and allowing them to proceed unchecked, in the belief that they are merely evidences of gouty neuralgia. In seeking to avoid both these errors, the pulse is the chief test to enable us to draw the line be-

tween real and apparent danger. When there is but little change in the pulse, the most severe pain in the head, chest, or abdomen—the most urgent vomiting—the most obstinate hiccup need not excite much alarm, for they will yield to simple treatment. But even though the symptoms be less distressing or threatening, and the pulse be feeble, irregular, or intermitting, there is immediate danger and necessity for prompt interference. In either case the exciting cause must be removed. If irritating matters remain in the stomach or bowels they must be cleared away, mental emotion must be calmed, mustard poultices must be applied on the stomach and to the feet, blisters to the neck if the head be affected, strong liniments and fomentations to the chest in cases of pleurisy or pleurodynia, and the most powerful stimulants given internally if the action of the heart fails.

In cases of chronic disease of the heart, in which earthy deposits within or around it appear to be connected with more or less fatty degeneration of the muscular fibre, not much assistance is to be looked for from any medicine except iron. Our chief efforts must be

made to induce the formation of healthy fibrine in the blood, by the influence of an animal diet, pure air, and such gentle exercise as may lead to efficient oxygenation of the blood, being careful not to overstrain the energies of the weakened heart by any hurried or sudden movements.

In treating cases of gouty irritation of the bladder, we must employ sinapisms and opiate enemata, repeating either until the pain and other distressing symptoms subside.

When collections of ropy mucus and the phosphates form in the bladder, the greatest possible temporary relief is afforded by washing out the bladder by means of a catheter with a double canula. Simple warm water may be used, or a dilute solution of hydrochloric acid is extremely beneficial in cases where a long continuance of deposit has led to a diseased condition of the bladder. The formation of the phosphates and the secretion of mucus, very soon diminish if the washing-out be repeated daily.

In treating gouty affections of the uterus, we must trust to the effects of the natural treatment laid down, and to the use of diluents

with colchicum and morphine internally, warm fomentations, baths, and sinapisms. During convalescence a stimulating plaster worn over the back affords great relief.

While this sheet was passing through the press, a valuable paper on Gout, by Dr. Begbie, appeared in the *Edinburgh Medical and Surgical Journal*, for January, 1854, which contains some interesting observations upon the effect of the disease in inducing functional and organic diseases of the uterine system, conduced by menorrhagia, leucorrhœa, dysmenorrhœa, &c. In one interesting case, after a long series of symptoms of nervous and thoracic disease, they were replaced by others, which at first Dr. Simpson was led to regard as those of spurious pregnancy. These were followed by indications of disease of the right ovary and pelvic cellulitis. This resisted treatment, when "indications of gout presented themselves in the middle joints of the fingers, and the urine was found greatly loaded with lithates." Under constitutional treatment, of which colchicum and the neutral salts formed a part, the whole disorder of the system "disappeared along with the catamenia in a fit of the gout."

Dr. Simpson appended a statement to Dr. Begbie's communication, in which he says, "I have seen several cases of inflammation of the uterus, or rather of the uterine region, of the nature of simple gout, or rheumatic gout ; or, at all events, I believe these inflammatory attacks to be of this special pathological nature, in consequence of their coexisting with, or following immediately upon, the presence of undoubted gout in other parts of the system." Dr. Simpson describes the organic change as effusion into the cellular tissue of the broad ligaments (evidenced by "tumefactions of considerable size around the sides of the uterus") and into the cellular tissue of the upper portion of the posterior wall of the vagina. In one case the lady "suffered repeatedly and metastatically in the uterus, simultaneously with, and sometimes after, the appearance of the disease in the extremities. The uterus was very large ; was fixed as if there had been perimetritis ; and in the attacks which I watched, it appeared to me that the wall of the organ and the peritoneal surface were usually the seats of the morbid action. In her there was no effusion with the neighbouring

cellular tissue." Dr. Simpson adds, "In none of the instances of gout of the uterus which I have watched, have I seen the inflammatory action attack the neck of the uterus, or the mucous membrane of the organ. Rheumatic inflammation seems to do so." The treatment recommended is the application of leeches and other local antiphlogistic means and the use of colchicum internally.

I have given these statements, though rather out of place in this chapter, to strengthen the arguments I adduced in a former part of the work, upon the frequent dependance of uterine disease on gout.

In treating any of these irregular manifestations of gout in either male or female, it is very important to follow correct principles in the administration of colchicum, to avoid the evils which follow its employment in excess, and yet not to neglect the benefits which its use in proper quantities is calculated to ensure. It must be constantly borne in mind that lowering treatment is scarcely ever supported in any of the numerous forms of these manifestations of gouty action, and that the exhibition of colchicum, in the ordinary doses,

depresses the system so much, that it leads to far more harm than good, and to evils which have been so generally recognized both by the profession and the public, that prejudices, not without foundation, have been raised against the use of the remedy under any circumstances. But the results, when the very small doses I have before recommended are employed, satisfactorily prove that we can obtain very great benefits from the use of colchicum without any depressing effect on the system, or any unpleasant consequence whatever. It is too much the custom to give this medicine in tolerably free doses, and leave it off as soon as relief of urgent symptoms is obtained, or when it has led to vomiting or purging. Now, it never should be given in doses which can produce vomiting or purging, and it should be continued in very minute doses, long after the most urgent symptoms have been relieved, with the view of preventing a return of those symptoms, and assisting the means, described in the chapter on natural treatment, in bringing about a healthy performance of the processes of nutrition. It may be given alone, or combined with some mineral water, according to circum-

stances, but in all cases where there is reason to apprehend deposit of the lithate of soda in any part of the body, it should be given with the small doses of iodide of potassium before recommended. I cannot speak too highly of this combination, if it be continued with sufficient perseverance, in almost any case of any of the varieties of latent or irregular gout.

## CHAPTER IX.

## THE TREATMENT OF JOINTS STIFFENED BY GOUTY DEPOSITS.

Constitutional treatment—Local treatment: friction, percussion, rotation, vibration, the douche, baths, &c., and their results.

It is too much the custom among those who treat cases of gout, to regard stiffness of the joints, which have suffered from the attacks of the disease, as an inevitable evil, and to rest satisfied with endeavours to shorten the attacks and postpone their recurrence, neglecting almost entirely any means of restoring stiffened joints to their former healthy condition. This is very much to be regretted, not only because swelling and stiffness in or around the joints is in itself a cause of great inconvenience and some suffering, but because it leads to the

necessity for the discontinuance of such an amount of active exercise as is necessary to secure a return to a healthy state of the general system—the only sure safeguard against future attacks.

In very advanced stages of gout, when the cartilages have been absorbed and replaced by layers of earthy matter, when the lithates and phosphates have been deposited in large masses in the bones themselves, when the tendons and ligaments have been altered in structure by similar deposits in and around them, and when long continued chronic inflammation has thickened and hardened every tissue around the joint, no honest man could allow his patient to indulge in hopes of receiving much benefit from any treatment adopted to restore such a joint to a sound condition. But it must be remembered, that as a morbid state such as that just described is only arrived at after years of suffering, and numbers of successive attacks, and as each of these attacks has performed its share in adding to the amount of local disease, so is the necessity made more apparent for watching the successive stages of departure from the perfectly normal condition,

and for endeavouring to repair the local injury which each attack has produced without delay.

In adopting any plan of constitutional treatment, in order to contribute to the restoration of joints stiffened by gouty deposits, our hopes of success will be strengthened by the recollection of the general law, that all the solid parts of the frame may be considered as precipitates from the blood, which are constantly being deposited, and as constantly dissolved or removed. While the form of each part remains unaltered, the material particles composing it are so constantly being renewed, that the solid parts of the body must be regarded as almost as changeable as the blood itself.

It must further be remembered, that in addition to the power we possess of inducing the formation of healthy blood, and the proper performance of the processes of the deposition and removal of the solids precipitated from it, by means of the natural and medicinal treatment described in previous chapters, that there are certain medicines which are deposited from the blood, and in a state of admixture or combination with the solid parts of the body.

Thus, mercury given in the form of blue pill or calomel may be detected in the solid structures after death. In one very remarkable case recorded by Dr. Taylor, a person died on the 27th of December. Towards the end of November, he took 12 grains of blue pill daily, 84 grains in all, or 28 grains of metallic mercury. On the 9th and 10th of December he took 12 grains each day, and though other doses were prescribed on the 19th and 25th, it was supposed that they were not taken, and that he had taken in all 108 grains of blue pill, or 36 grains of metallic mercury in about a month, it not being proved that any had been taken within eighteen days of death. On the 27th of April, the body was exhumed, that is four months after interment, and on the 7th of May, Dr. Taylor detected mercury in the substance of the liver, and in the coats of the stomach of the deceased. Arsenic also, as every one knows, has been detected in the viscera of those who have been poisoned by it after several years' interment.

It is quite clear, that the whole of the blood in the body is very soon impregnated with certain medicines, and that these medicines

remain a long time in the body, for it has been proved, that one dose very soon reaches the bladder, and that the process of elimination goes on for a long time. Mr. Erichsen's experiments with the ferrocyanide of potassium showed that this salt reached the bladder at periods varying from one to thirty-nine minutes according to the state of the stomach of the patient, and one dose of 20 grains left traces detectible in the urine after twenty eight hours. MM. Miller and Laveran detected antimony in the urine twenty-four days after its administration, and in other cases, at periods of twenty, nineteen, eighteen, seventeen, and sixteen days respectively. (Taylor, on *Poisons*, p. 822.)

Iodine, also, when employed either externally or internally, is to be detected in the blood (if not in the serum in the crassamentum) and in the secretions, as the urine, saliva, tears, perspiration, milk, &c., in the state of an iodide. It is very readily detected by adding a cold solution of starch to the suspected fluid, with a few drops of nitric or sulphuric acid or a solution of chlorine, when the blue iodide of starch is at once produced. Dr. Cogswell has

detected the iodide of potassium not only in the blood and secretions, but in the brain and spinal chord, in the liver, spleen, muscles, tongue, and in the bones freed from their appendages. It has been found in the urine several days after any had been administered, and iodine has been found in the liquor amnii of a pregnant female, who had taken the iodide for four months previously. Landerer also detected it in the testicle of a man to whom he had administered it.

The iodide of potassium has very slight chemical action on the tissues of the body, and produces no obvious changes when mixed in solution with its most abundant organic constituents, albumen, fibrine, or gelatine. It is therefore a much better form for administering iodine than a solution of the latter in spirit. The plan adopted by some persons of adding small quantities of iodine to the iodide before administration is a mistake, for the medicine must act in proportion to the quantity absorbed. Now the iodide of potassium contains three-fourths of its weight of pure iodine, so that a patient taking a scruple of the iodide in twenty-four hours, takes 15 grains of iodine in

that period. Of course the addition of half a grain or a grain of iodine to this could have but little effect on the constitution, while the acridity of the iodine is very apt to disorder the stomach.

All this is surely sufficient to prove, that the hope of acting upon a salt deposited in some of the tissues of the body is not unfounded, for in the iodide of potassium we have a soluble substance which is rapidly absorbed with the blood, which may be detected in the tissues of the body and in the excretions long after administration, proving that it can exert a persistent influence; and as this salt has the power of dissolving the lithate of soda,—the material which is the principal cause of the stiffening of joints, by being deposited in and around them,—we can understand that the benefit experience has shown to follow the use of the iodide may be explained by established laws of physiology and pathology, and by the chemical properties of the remedy.

When first I began to give this remedy, I was of course anxious to determine if it could be given with safety. It was known that in some few cases ill effects had followed its use, but the

fact, that enormous quantities had been given in this country and on the continent for weeks together in other diseases, was sufficient to show that ill effects must be very rare, and that the smaller doses required in gouty cases could be given with perfect safety. My experience for the last thirteen years has quite borne out this view, for I have never, in any case, seen any unpleasant symptom which could be fairly attributed to the use of the iodide which did not at once disappear on the discontinuance of the medicine. I have given it in various doses, but I find that, except in cases of combination with syphilis, when 24 grains daily may be required, one grain three times a day is quite as much as can be given for any length of time with benefit or safety, and that very often a third of this quantity, or one grain daily, in divided doses, is quite sufficient. I have already stated, that I frequently combine this with equally small doses of colchicum, and with the most encouraging results. It should always be given in weak solution, as in strong solution it causes purging, and it should be remembered, that it has been adulterated to the extent of seventy-five per cent. with carbonate of potass.

It is scarcely necessary to repeat that this constitutional treatment must be assisted by an observance of the rules laid down in the Chapter on Natural Treatment. If these be neglected the best efforts will prove unavailing.

Friction and percussion form an important part of the *local treatment* which we employ as auxiliary to the constitutional.

After ordinary attacks of acute gout the joint is left somewhat swollen, stiff, and weak, but there is neither pain nor heat. This is the time to remove the stiffness and weakness by friction. Simple friction by the hand of another person answers very well. It should be employed morning and evening for half an hour or three quarters at each period, the hands being passed, with gentle pressure, rapidly round the affected joint in all directions. The exhalation from the skin is thus remarkably increased, congestion of the cellular tissue is dissipated, and the absorbents are stimulated. It may be followed by passive motions of the joint, then gentle exercise, and moderate pressure by an elastic bandage.

When joints are more permanently enlarged, and the tissues around them are thick-

ened, more active friction and gradual extension may be employed, the friction being assisted by some medicated substance. An ointment of the iodide of potassium, made by dissolving half a drachm of the salt in water, and then mixing the saturated solution with an ounce of fresh lard, is perhaps the best. The solution prevents any gritty particles from irritating the skin. Sometimes glycerine, simple oil, or starch powder, may be used if the skin be tender.

Local medicated baths are also useful when combined with friction. An ioduretted bath may be made by dissolving 10 grains of iodine and 25 grains of iodide of potassium in half a gallon of water, and thus forming a foot-bath in a wooden tub. The nitro-muriatic acid bath also appears to be useful in some cases. It is made by mixing three ounces of the diluted acid in a gallon of water. The temperature of these baths may be varied from 70° to 90° Fahr. according to circumstances. The feet and ankles should just be covered by the fluid, and the person who applies the friction should carry it on around the joint of each foot alternately for two or three minutes, the whole

process being kept up about a quarter of an hour twice a day. The mechanical influence of friction appears to be thus assisted by the chemical agency of the iodine or acids on the absorbents.

After friction has been discontinued, and in some cases over the small joints when its application is painful, the iodine paint proves useful. It is made by dissolving a drachm of iodine and half a drachm of iodide of potassium in an ounce of alcohol, and is applied with a brush daily. When the cuticle peels off it is re-applied, as soon as the skin beneath is firm.

*Percussion*, or rapid tappings around the joints with the sides of the hands or tips of the fingers,—vibrations or tremulous shakings of the joint,—and rotation, the patient remaining perfectly passive or quiescent, are means which are much adopted on the Continent, especially since the introduction of the system of Ling, and which have a powerful effect on circulation and absorption in the tissues acted upon, promoting the natural warmth of the part, and supplying a kind of artificial exercise to joints which would otherwise remain inactive. The irritable and enfeebled nerves are

restored to their natural condition, the relaxed muscles acquire tone, and the movements, which are at first entirely passive, in time become spontaneous and active—the processes of assimilation and secretion at length being normally re-established. The action of tremulous shaking especially seems to have great effect in making absorption more rapid and assisting in the removal of morbid deposits. Venous absorption also is hastened by temporary application of compression above any part, as the obstruction to the circulation which produces some distension of the veins for a short time, leads to reaction and increased vigour. Rotations appear to increase the secretion of synovia considerably, and thus to render motion much more easy by lubricating the opposed surfaces of the joints. They also seem to act favourably on the ligaments.

The douche, a powerful stream of tepid or warm water, or steam, may also be used with good effect in many cases. It combines the effects of local counter-irritation or derivation with the soothing properties of a fomentation.

I cannot direct attention too strongly to the efficacy of the combined effects of friction, per-

cussion, vibration, and rotation, with the use of iodine ointments or baths, or the nitromuriatic acid bath, provided an experienced rubber be employed, and the system be pursued with perseverance during a continuance of suitable constitutional treatment. The results frequently exceed all reasonable expectation. I have seen ankle joints, apparently perfectly stiff, which had lost all their natural appearance from swelling and thickening and which had not been moved for many months, acquire nearly a normal shape, become diminished three inches or more in circumference, and admit of tolerably free motion in from six weeks to three months. I have seen patients who have been quite unable to walk without crutches, owing to this stiffness of the knee and ankles, put them aside, and walk with a stick, which has also become unnecessary at last, and the former cripple has astonished all his friends by walking and riding as freely as ever, or nearly so,—and I am convinced that equally favourable results might be very frequently attained if the treatment I have recommended were more generally followed.



## A P P E N D I X.

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### I.

ON THE TREATMENT OF ULCERS BY GALVANISM.

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## No. I.

ON THE TREATMENT OF ULCERS BY  
GALVANISM.

(From the "Medical Times and Gazette," July 23, 1853.)

SINCE the year 1847, I have had repeated opportunities of observing the therapeutical influence of a single galvanic current upon ulcers and granulating surfaces. Several cases have lately fallen under my care in which this influence has been most remarkably beneficial. I have, therefore, drawn up, in the form of a series of propositions, the results of the whole of my experience.

The apparatus I have used has been of two kinds. The first is a single pair of plates,—namely, an oval plate of zinc from one to three inches in the long diameter, and a plate of pure silver of the same size and form, the two being connected by a silver wire soldered to the back of each plate. The second I have only used for about a year. It is Pulvermacher's electric chain, which I have used with six and eight-

teen elements. I shall first state the result of my experience with a single pair of plates since 1847, subsequently remarking upon the comparative influence of Pulvermacher's chain.

1. To secure the effects of the apparatus, it is necessary that the surfaces of the two metallic plates be perfectly smooth and clean, and that they should be applied to the body without intervention of any substance whatever. At first I believed that it was necessary to denude the cuticle; and accordingly, when I required to act upon an exposed surface, I applied one plate upon it, and made a small puncture in some neighbouring part, upon which the other plate was applied. I soon found that this was unnecessary, and that it was only necessary to moisten the cuticle to insure the passage of the current. When moistened by vinegar, or an acid solution, the effects were quite as rapid as after denudation of cuticle.

2. If two slight excoriations, two ulcers or suppurating surfaces, upon a limb or any part of the body, be acted on by the pair of plates, the zinc being applied upon one, the silver on the other, the surface beneath the silver rapidly cicatrizes, while that beneath the zinc is in two days converted into a superficial eschar. If the plates be still kept applied, the eschar extends to the subcutaneous cellular tissue, and presents all the characters of a slough produced

by caustic potash, except that the dead tissues are a little less compact. After the separation of these sloughs, cicatrization under ordinary applications is very tardy, but is much hastened by the application of the silver plate, the zinc being fixed on some neighbouring part. So long as the zinc plate remains upon an exposed surface, a copious exudation of foetid serum goes on from it, and a dark, soft, spongy slough is produced, which does not clear away for two or three days after the zinc is removed. After the separation of the slough, an excavation is left, and the granulations are healthy. They reach the surface level much more quickly when the silver plate of the apparatus is employed, than under any other treatment. That this good effect is not due to mere pressure of the metallic plate, I have become convinced, after comparative trials of the application of the silver, with and without connexion with zinc. I have made numerous trials of the methods of Baynton and Scott, of water and dry dressings, of elastic bandages, and various other accepted modes of treating ulcers, and have found no means so capable of uniformly producing a rapid growth of healthy granulation as galvanism.

3. I have often been astonished at the change effected in twenty-four hours in the condition of ulcers. At one dressing they are seen to be deep, cup-like excavations. At the next the granulations

have nearly reached the surface. On the third day the surface level of the skin and granulations is often uniform, the well known marginal blue rim announcing the commencement of cicatrization. When this point is attained, it is better not to apply the apparatus again, but to employ simple water-dressings, or, if there be any tendency to flabbiness in the granulations, dry lint, and a strap of adhesive plaster. When I was assistant-surgeon in her Majesty's ship *Hibernia*, a form of contagious circular sloughing ulcer was very prevalent. We used to destroy the diseased surface by undiluted nitric acid, and apply the galvanic apparatus as soon as the slough separated. The men were often allowed to walk about, and suffered no more impediment from the apparatus than from a simple bandage. Much trouble was spared in dressing, as the apparatus was only removed once in twenty-four hours. In that very obstinate form of ulcer, naval surgeons are so frequently called upon to treat, called by the men, "a burn with a rope," in which coils of rope, twisted round a limb, destroy a ring of integument, fascia, and perhaps muscle, the slowness of the natural process of repair under any variety of ordinary treatment is quite peculiar. I treated a case of this kind when surgeon of her Majesty's ship *Trafalgar*. The integuments, fascia, with some portions of muscle, were destroyed all round the calf of

the leg ; the tibia and fibula being laid bare. The slough separated, and an annular ulcer remained nearly two inches in breadth. The man was a long time on the sick list before I applied the galvanic apparatus. Scarcely any signs of a reparative process had appeared when I applied the silver plate of the apparatus to a portion of the ring ; and it was quite extraordinary to trace the daily effects as the plate was moved around the large ulcerated surface ; the spots where the silver had been applied for only twenty-four hours being far above the level of other parts, and consisting of small conical granulations, in place of the flat, flabby surface which had formerly existed. Cicatrization afterwards took place as readily as in ordinary cases.

4. When the zinc plate is applied upon the superior portion of a very large ulcer this portion alone improves in appearance, while the inferior portion degenerates ; but if the plate be applied upon the lower portion only, the whole surface of the ulcer improves equally.

5. In cases where several ulcers exist upon a limb, and the zinc is applied to a superior, the silver to an inferior one, all the ulcers situated in a direct line between the two plates improve in appearance, become healthy sores, and cicatrize, while those on either side of the current remain unaltered, and sometimes degenerate.

6. When the silver plate is applied upon the extremity of a fistulous sore the effect does not extend beyond the edges ; but if a projecting portion of the silver be carried to the bottom of the fistula, granulation rapidly follows. It is very easy to perforate the silver plate by a screw, the point of which is smooth, and adapted in size and shape to that of the fistula. I found this plan answer admirably in a case of perineal fistula, which persisted long after perfect dilatation of a stricture of the membranous portion of the urethra. In cases of open bubo, with burrowing sinuses, I have introduced a small silver chain to the bottom of the cavity, and connected it either with the plate of the single pair or with the copper end of Pulvermacher's chain. The result has been invariably satisfactory. I saw a case in her Majesty's ship Scourge, of a man who had been eight months on the sick-list from a bubo in this state ; yet he was well after the chain had been used for one week only, in the manner I have described, by my friend, Dr. Davidson, surgeon to the ship.

7. In several cases normal innervation has been restored in paralysed parts under the use of this apparatus, the zinc being placed superiorly, and the silver inferiorly, so as to include as nearly as possible the whole of the paralysed part. Disordered function of particular nerves has been also remedied, by so placing the two plates that the nerve lies between them.

8. Whether the single pair of plates, or Pulvermacher's hydro-electric chain, be used, a much better imitation of the natural currents of vital electricity is afforded than by the batteries in common use. The action of the latter is powerful, and only susceptible of temporary application, while that of the former is mild, uniform, and continuous, an electric current circulating continually in the same direction from one plate or one end of the chain to the other, through any part of the body which is between the two poles. The single pair of plates never causes any pain or uneasiness to the patient, never producing more than slight itching or numbness, while in many cases where the action is very evident, no sensation whatever is felt. When Pulvermacher's chains are used, the sensations vary with the length of the chain, and the strength of the acid in which it is soaked before application. That I have most commonly used has been only eight links, and soaked in distilled vinegar. Itching or tingling sensations are felt for an hour or two, and are renewed as often as the chain is soaked in the vinegar, but nothing approaching to pain is complained of. With a chain of twenty-four links, soaked in the same acid, the tingling sensation is sometimes so acute, as to be troublesome, but still not painful. With regard to the relative advantages of the chains, or the single pair of plates, my present experience would lead me to prefer

the plates in ordinary cases of ulcer, where they could be applied without producing painful or injurious pressure. I have found, that even where a chain of eight links was only moistened with water, the current has been too strong, and made an ulcer irritable. On the other hand, the chains have great advantages over the plates when ulcers are situated over bones, or are too sensitive to bear metallic pressure. They are also to be preferred in cases of indolent ulcers in weak persons, as, in such cases, the current of the single pair of plates is too feeble to excite any very speedy influence.

I shall conclude this paper by short notices of some cases in which the plates or chain have been applied during the year in her Majesty's ship *Modeste*.

CASE 1.—J. B., aged 18, grazed the right shin by a fall. Three superficial ulcers followed, and he was put on the list on the 15th of October. Water-dressing was used until the 20th, but no change for the better took place. Pulvermacher's small chain, excited by vinegar, was applied on the 20th, kept constantly fixed, and only removed to be soaked again in the vinegar in the evening. On the following day, the ulcers were so nearly cicatrized, that it was not thought necessary to re-apply the chain. Water-dressing was used, and the sores again degenerated. On the 3rd of November the chain was applied again near the sore, but, from the slipping of the

upper end, in such a way that the current did not pass through it. On the following day no change had taken place, but the chain was re-applied, so that the current should pass through the sore. On the 5th it was very nearly healed. Chain kept applied. On the 6th cicatrization was perfect, and he was discharged to duty on the 7th.

CASE 2.—C. H., aged 17, received a wound below the left external malleolus, which was followed by an indolent ulcer. He was put on the list on October 15, and treated in various ways until the 26th without any benefit, when the single pair of plates was applied. On the evening of the 27th, no change having taken place, Pulvermacher's chain was applied. On the 28th half the ulcer was quite filled up and cicatrized, the other half nearly so. On the 29th, the chain having been constantly applied, cuticle had formed in the centre of the ulcer at the exact spot where the metal had been in contact. In order to determine if this were accidental, or owing to the galvanic current, the chain was discontinued, and simple dressing applied. The boy got his feet wet with salt water, and the sore again assumed an indolent, unhealthy appearance. On the 16th of November the chain was applied, but wetted with water only. On the 17th not much effect had been produced, but the surface appeared more healthy. Continue. 18th.—Slight improvement. Wet the

chain with acid. 19th.—Cicatrization nearly complete. Continue. 20th.—Cicatrix quite perfect. He returned to duty on the 22nd.

CASE 3.—E. H., aged 27, applied on the 3rd of January, with an unhealthy sloughing ulcer on the foot, with inflamed edges. Poultices were first used, but no improvement followed. On the 5th the single pair of plates were applied. 6th.—Sore cleaner. Continue. 7th.—Slough separated. Wet compress only used. 8th.—The wound had again degenerated, and continued to do so until the 10th, when the plates were again applied. On the 11th the surface appeared healthy, but there was a deep, excavated, cup-like ulcer left, which did not appear to fill up. On the 14th Pulvermacher's chain was applied. On the 15th the sore was much contracted in circumference. Continue. On the 20th the granulations being level with the surface, the chain was omitted, and water-dressing used; cicatrization afterwards proceeding naturally.

CASE 4.—G. W., aged 19, applied on the 9th November with an open bubo in the right groin, which he had concealed as long as possible. It had opened spontaneously. The edges were inflamed and undermined, the whole surface appearing very unhealthy, with a bloody sanious discharge. Black wash was first applied, then a lotion of diluted nitric acid, with solution of opium, but no improvement

whatever had taken place up to the 14th. On that day Pulvermacher's chain was applied, the copper end being connected with a metallic plate which covered the whole exposed surface. It was kept constantly applied during that and the following day. On the 16th there was an appearance of commencing granulation, which, on the 17th, was much more distinct. The chain was still continued. The granulations had reached the surface by the 20th, when it became necessary to open a long narrow sinus, which extended downwards and inwards, and on the 23rd another, which extended outwards. Simple water-dressing was used until the 26th, but no healing process began. On that day the single pair of plates was applied. From this time granulation and cicatrization went on rapidly, the plates being kept constantly applied; but he was not sent to duty until the 20th of December, owing to an attack of diarrhoea.

CASE 5.—Mr. D., aged 20, had suffered on the coast of Africa, with an obstinate ulcer on the leg over the middle third of the tibia, and, after being four months on the sick-list of his ship, had been invalided. The ulcer healed in England, but left a large, thin, red cicatrix adherent to the surface of the bone. This gave way when he was in the *Vengeance* on this station, and he was again several months on the list before it healed. On any slight

injury to the cicatrix it broke down. He wore a padded metallic plate for protection, but he applied to me on the 30th of April, the old cicatrix being then completely converted into an ulcer three inches in length and two in breadth, with a livid soft surface, and foetid sanguous discharge. Various simple and stimulating applications were used without effect. The single pair of plates was applied, but the pressure on the tender surface of the ulcer could not be borne. Pulvermacher's small chain was applied, and produced a good effect, but so slight that the large one of twenty-four links was used. After this very rapid improvement took place, and he returned to duty after having been thirty-four days on the list, the ulcer, according to his own statement, having been in a worse condition than when he had been several months on the list on former occasions. He was again on the list in June, September, and November, with the same ulcer, which had been reproduced once by the kick of a horse, and the other twice by blows received on board. On each occasion the inutility of ordinary applications was proved, and the great benefit derived from the long chain of Pulvermacher was most obvious. The average stay on the list on these three occasions was twenty-two days. The cicatrix is now much firmer, harder, and less adherent to the bone than when he joined the ship.

I might narrate many other cases, but the foregoing

appear sufficient to illustrate the statements I made as to the therapeutical efficacy of galvanism in the treatment of ulcers.

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## No. II.

### ON THE CURE OF SQUINTING BY THE USE OF PRISMATIC SPECTACLES.

(From the "Medical Times and Gazette," August 27, 1853.)

DR. KURKE, a Dutch physician, first recommended prismatic spectacles for the cure of squinting. He has recorded one case cured by their use in the Dutch journals. Dr. Von Gräfe, of Berlin, has since employed them very extensively. During a recent visit to Berlin I had frequent opportunities of observing their effects upon his patients, and I think that the result of his experience should be made known to the Profession in England.

The glasses are fitted in ordinary spectacle frames. They are simple prisms of various degrees, from one to twenty. It would be possible to make them achromatic; but I have only seen the ordinary ones in use.

The operation upon the sound eye, as explained

by Dr. Von Gräfe, is as follows :—When a prismatic glass is held before one eye on any point of sight in the converging direction of the optic axis, the light falling upon this eye is diverted from its former course, and no longer arrives upon the macula lutea, but forms a more or less excentric picture, according to the refracting power of the prism. From its position, this is no longer combined with the central picture on the other retina into one perception, but is perceived separately. Thus the object upon which the optic axes converge is seen double.

Theoretically this phenomenon should be observed when a prism of very moderate power is used ; but observation teaches us, on the contrary, that no diplopia follows when weak prisms are employed, especially if the base be directed outwards. This might be explained in two ways. Either the picture on one retina is suppressed, or the eye which sees through the prism takes a new position, which is not perceived by the observer, so that the picture is not formed excentrically, but falls, like that of the other eye, upon the macula lutea. The improbability of the first supposition at once appears from the fact that no diplopia is produced by weak prisms, while more powerful ones produce it at once, for the greater the excentric position of the picture the more easily it would be suppressed. The truth of the second explanation is established by a more exact observation

of the position of the eyes. On applying the prism we see the optic axes deviate from their former position and return to it as the prism is removed. At the moment of removal the object is seen double, because both axes are not directed upon it. Thus in order to prevent diplopia, an involuntary strabismus occurs, and we can produce this in any direction by corresponding positions of the prism, but most decidedly so inwards, less so outwards, much less so downwards, and least of all upwards. We can also produce strabismus in this manner in diagonal directions.

It follows that by the use of prismatic glasses, we have the power of altering the tension of any given muscle of one eye without producing any alteration in the other. This is the peculiar advantage which none of the ordinary orthopædic means formerly employed possessed. On the contrary, the result hoped for from their employment was not only frequently frustrated by the movements of association of the two eyes, but sometimes, as in cases of recent muscular paralysis, an effect directly the reverse of that desired was brought about.

The increased contraction called for from the relaxed muscle by the use of prismatic glasses is the source of their curative power. For example, in a case of convergent strabismus with diplopia a prism with its base directed outwards alters the position of

the excentric picture on the retina of the squinting eye so greatly, and brings it so near the macula lutea, that single vision follows any voluntary power conveyed to the abductor muscle. Consequently, the angle of the squint is somewhat diminished. As it becomes less, and the power of the abductor increases, prisms must be used gradually diminishing in power, until at last a perfectly accurate corresponding position of the eyes is attained at all distances,—in other words, the squint is perfectly cured. I have seen patients of Dr. Von Gräfe's, who were thus completely cured in about six weeks, commencing with strong glasses of the numbers from 15 to 20, and gradually wearing them less and less powerful. They are principally applicable in young persons, who squint but slightly; and in cases of diplopia biocularis, where the abnormal position of one eye is only observed when an object some feet distant is regarded, they are the only certain means of cure.

In more marked degrees of strabismus the muscle must be divided, because the use of strong prisms, and the efforts of the patient to avoid diplopia, become very troublesome; and if the union of the two images causes too great an effort, an effect is produced exactly the opposite of that desired; for if the diplopia cannot be removed, the double images separate still further from each other, because, when distant, they are not so intolerable as when near.

In many cases after operations for the cure of strabismus by division of the muscle in one or both eyes, although great improvement follows, the cure is not perfect. Some degree of squint still persists in one eye, and probably some diplopia when objects at certain distances from the eye are attentively regarded. In such cases, the prismatic glasses suffice to complete the cure commenced by the operation. I saw several instances in which this proved to be the case in the practice of Dr. Von Gräfe.

NOTE.—Since this passage was written, many cases of squint have been treated by these spectacles by my friends and myself. The result has been very satisfactory in slight cases, such as one would scarcely be justified in submitting to operation. I have seen such cases completely cured in six weeks, when the power of the squinting eye was not much less than that of the opposite one. In cases where the reading distance between the two eyes varies very much (as it does in very many squinting persons, who cannot read a book with the distorted eye at the distance of more than two or three inches from the eye, while they can read with the opposite eye at ordinary distances,) the prisms are useless until the power of the distorted eye has been strengthened by exercise, using it while the opposite eye is covered. In covering the opposite eye, I do not use an ordinary

shade or bandage, but have an indian-rubber ring which fits the orbit, covered on the outside and edges with silk, and fastened round the head by a ribbon. This allows free motion of the covered eye and eyelids, while the light is perfectly excluded. It is well known that this plan alone will often cure slight squinting, but it is very tedious, as the shade must be worn at least six months as a general rule, and sometimes for more than a year, while six weeks or two months suffice to effect a cure by the prismatic spectacles in slight cases. Messrs. Watkins and Hill, of Charing Cross, Messrs. Carpenter and Westley, of Waterloo Place, and Messrs. Bland and Long, of Fleet Street, make the spectacles.

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### No. III.

#### SOME ACCOUNT OF A NEW OPHTHALMO- SCOPE.

(From the "Medical Times and Gazette," Sept. 10, 1853.)

AT the conclusion of the late Mr. Dalrymple's "Pathology of the Human Eye," the lamented author stated that no plates of amaurotic diseases had been given, "because the objective symptoms are scarcely subjects for the artist, little generally being

visible suited to pictorial representation." He adds, and few would be found to dissent from his views, "Moreover, the history of amaurosis has, I humbly submit, yet to be written. It is among the most difficult subjects in ophthalmic medicine, and well worthy the labour of a life to investigate, explain, and supply a rational and successful therapia."

I think it will be found that the investigation of this important subject will be much facilitated by the aid of sundry instruments recently constructed in Germany for the purpose of illuminating the retina in such a way that its condition may be examined in the living eye. Helmholtz, of Königsberg, deserves the credit of originating the movement; and his *Beschreibung eines Augenspiegels* contains a full explanation of the principles on which illuminating mirrors should be arranged. The greater part of this *brochure* has been translated in the *Edinburgh Monthly Journal of Medical Science*, and a full description of Helmholtz's mirror is also given, with some account of modifications made by Epkens and Rekos, and a description by Dr. Donders, of Utrecht, of the appearances he observed in two cases of partial amaurosis, by the assistance of one or other of these instruments.

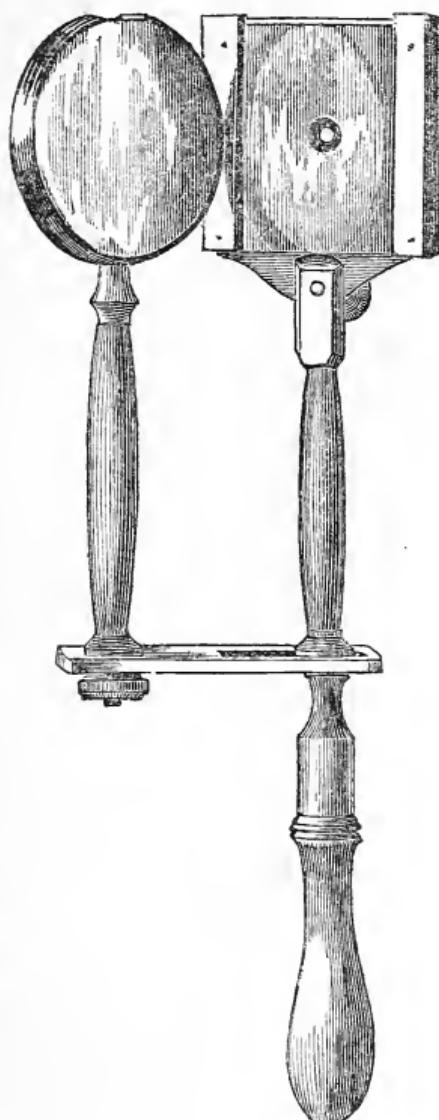
The instrument of Helmholtz is undoubtedly a great assistance in examining the condition of the refracting media of the eye. The condition of the

lens and its capsule, and of the vitreous humour, can be much more accurately defined by its use than by ordinary observation ; but, after numerous trials, I became convinced that its illuminating power is far too feeble to enable one to see at all distinctly anything whatever on the retina, and that an instrument more recently contrived by M. Coccius, of Leipzig, is immeasurably superior in this respect. The instrument of Helmholtz is preferable for examining the refracting media, and it possesses the great advantage, that it may be used with an undilated pupil without producing much contraction ; while the intense light from Coccius's instrument requires full dilatation, or the pupil becomes closely contracted. But, for the grand object of examining the condition of the retina itself, this latter instrument is very far superior to any other that I have seen.

This instrument consists, as may be seen by the accompanying woodcut, of a perforated mirror and a lens. The rays of light from a lamp are concentrated by the lens and thrown on the mirror. This is held before the eye to be examined, and the rays are thrown through the pupil on to the retina. The unabsorbed rays return in the same direction, and are received by the eye of the observer, which is behind the mirror, at the spot where it is perforated.

In a healthy eye, the part behind the pupil is absolutely dark. Even when the lens and vitreous

humour are clear and transparent, no ordinary examination, even when the pupil is dilated, can afford any



information as to the appearance of the retina. Without some artificial assistance, we cannot illumi-

nate the retina and also see the illuminated part. The rays of light return from the retina in the same direction as they were thrown on to it, so that we cannot bring our eyes into the direction of the rays of light returning from the retina without at the same time cutting off the supply of those rays. But, by the aid of this instrument of Coccius, the rays are reflected at an angle upon the mirror, are then conveyed to a focus on the retina by the media of the eye, and the unabsorbed rays, on leaving the eye, return to the mirror whence they came, and are also received by the eye of the observer.

When the instrument is to be used the pupil is dilated by atropine, if not naturally dilated. The patient is seated in a dark room near the corner of a table, on which a bright lamp is placed at the level of the eye. The surgeon sits before the patient, and screens the face of the latter by an upright shade, so that the eye is the only illuminated part. Holding the mirror opposite the eye, he then adapts the lens in such a manner that a bright concentrated light is seen to fall on the pupil. Then he applies his own eye to the back of the mirror. The instrument is held at different distances from the eye until a clear view is obtained, and then the patient, by moving his eye in different directions, exposes the different parts of the retina to view. This appears rather difficult at first, but a very little practice enables one to find

the proper position of the instrument. When the retina is not clearly seen although the pupil is well illuminated, a concave glass is interposed between the mirror and the observed eye, by the hand not employed in holding the instrument.

Examination of the retina in this manner is very interesting. Bloodvessels are first distinctly seen ramifying upon it, and by tracing them from the smaller branches to the larger roots, we arrive at the point where the optic nerve enters. This differs in appearance from the rest of the background of the eye, as it is not covered by pigment, or a network of vessels, but a sort of transverse section of the nerve here lies open to view, with a few fine vessels passing through it. The arteries and veins of the retina enter and leave near the inner part. Sometimes a portion of the vessels may be seen concealed in the substance of the nerve itself, showing that this substance is transparent during life. The two orders of vessels are distinguishable from each other as the blood is of a brighter colour in the arteries, and the walls of the latter and their first subdivisions are thicker than those of the veins. Pulsation cannot be distinctly recognised so far as I have been able to discern, though some observers fancy they can see it. The first divisions of the vessels border the inner side of the optic nerve, and then extend all over the field of the retina. The appearance of the red ves-

sels on the illuminated base is really beautiful. Helmholtz remarks, that, close to the inner side of the nerve, he has always remarked a small semilunar strip of shadow, which appears to be from a fold of the retina. This appearance is universal, and is doubtless produced by the plica semilunaris. In most parts of the eye the base appears of a yellowish red, of a brighter red around the optic nerve, and darker the further we pass from it,—not of an equal colour, but as if with small darker patches. The point of direct vision (macula lutea, or foramen of Soemmering) has a peculiar appearance. The eye is directed exactly upon the ray of light, and the retina is seen at that spot to be darker, greyish-yellow, without admixture of red; and no traces of capillary vessels can be seen on it. It is difficult to make this out without practice, because the reflexion from the cornea is apt to destroy it; while this reflexion does not interfere when the eye is turned to either side for the examination of the lateral portions of the retina.

As an auxiliary in diagnosis, the ophthalmoscope must prove very valuable, as anything opaque before the retina must mask its vessels. Cloudiness of the vitreous humour, according to its degree, will obscure the view of the vessels of the retina. Opacity of the lens or its capsule would, of course, act in the same manner.

But it is in assisting the study of pathology of amaurosis that the chief utility of the instrument will be found. Dr. Donders has already distinguished a limited effusion of blood between the choroid and retina, or in the latter membrane itself with chronic inflammation,—in one case of insensibility of about two-thirds of the retina. After examining a great many sound eyes, I have myself detected, in various forms of partial or total amaurosis, congestion and varicosity of the vessels of the retina, partial removal of the pigment in patches, and exudations into the substance of the retina, or upon its surface. Representations of these appearances, when accurate, are exceedingly beautiful; and the objective symptoms of amaurosis thus become admirable subjects for the artist. When they have been thoroughly examined and carefully recorded, they must contribute important information towards the history of the disease which Mr. Dalrymple so justly said has “yet to be written.”

NOTE.—Dr. Coccius’s own account of his instrument is to be found in a work published last year at Leipzig, entitled *Ueber die Anwendung des Augenspiegels*. This year a fuller work on this instrument, its application and modifications, with contributions to the diagnosis of internal diseases of the eye, has been published at Lahr, by Dr. Schauenburg, a teacher in

the University of Bonn. It is a translation from the Dutch of Dr. Van Trigt, with additions by the translator. The history of the discovery of the instrument, and the account of its various successive modifications are fully treated. The physiological section contains the result of observations on the healthy eyes of animals and of man, and in the pathological section, the author records forty-five different observations of diseased human eyes in various conditions, the changes in some being referred to the lens or its capsule, in others to the vitreous humour, and in the remainder to the retina and choroid. The appearances are very well represented in twelve plates appended to the work, showing the normal aspect of the retina and its vessels, and of the vessels of the choroid seen through the transparent retina—the appearance of cataract—a good representation of the appearance of fibrinous exudations on the surface of the choroid, and of other diseases of this membrane, with some of the various aspects of the retina in cases of amaurosis, as black spots referred by Dr. Schauenburg to traumatic extravasation of blood, deposits of pigment, white exudation masses, with abnormal formation of pigment and atrophy of the vessels of the retina, and dropsy of the choroid. I have seen all the appearances represented in Dr. Schauenburg's plates, but we require examination after death of eyes observed during life, to determine the true significa-

tion of such, that we can see with the ophthalmoscope. The more I use it, the more I become convinced of its great value as an aid to diagnosis in cases of impaired vision, and I shall take a future opportunity of enlarging upon the subject.

Messrs. Carpenter and Westley, of Waterloo Place, make the instrument of Coccius extremely well.

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#### No. IV.

### ON THE USE OF CHLOROFORM INHALATIONS IN THE PALLIATIVE TREATMENT OF PHTHISIS.

(From the "Medical Times," Oct. 11, 1851, read before the Royal Medical and Chirurgical Society, April, 1851.)

ONE of the last wishes expressed to me by a nobleman, recently deceased, was, that I should take the earliest opportunity of making known to the Medical Profession the great relief afforded by chloroform in every attack of difficult breathing and spasmodic cough from which he suffered during the last eight months of his life.

The patient was thirty-seven years of age. He was first seen by me in October, 1849. At that time he had suffered from cough and some difficulty of breathing for about a year, and had been out of

health for some months before any cough was observed. Early in 1848 he was forty pounds below his ordinary weight, and this loss he never regained. At my first examination I detected disease in the upper part of the right lung, and my diagnosis was confirmed soon afterwards in Paris by Louis. I accompanied my patient during a nine months' voyage in Egypt and Italy, and returned with him to England in July, 1850. Sir James Clark and Dr. Bright then saw him, the disease being very much in the same state as when he left England. It progressed, however, in the autumn, and was advancing rapidly when he was seen by Drs. Forbes, Watson, and Walshe, in October. It ran the usual course, and was terminated by death just after the opening of the new year. Examination of the body after death showed the existence of tubercular deposits and cavities in the lungs, and ulceration of the trachea.

From the very first the sense of oppression in breathing, the feeling of inability to fill the chest, and the violence of the convulsive or spasmodic cough, were much greater than usual. Most of the favourite sedatives and narcotics, demulcents, and counter-irritants, and ordinary inhalations were employed, but without any evident benefit. Opiates, in particular, appeared to do harm, by inducing a general dry condition of the bronchial mucous membrane. During the voyage on the Nile the urgent

symptoms almost disappeared, but returned with increased violence in Italy. At Rome, in May, the violence of the cough was quite extraordinary, and the fits of difficult breathing resembled those of pure spasmodic asthma. I was called to him in one of these fits just after having employed chloroform for another purpose. The thought then occurred simultaneously to his lady and to myself, to attempt, at any cost, to give some temporary relief. I accordingly threw a few drops of chloroform on a handkerchief, and held it before his face. The most complete relief was afforded immediately. In a few seconds he passed from a state of extreme suffering to one of perfect ease. Tolerably healthy respiratory murmur was heard in parts of the chest where loud cooing and whistling noises had been heard just before. From this time he would never be without chloroform in his room. He thought once or twice that it left a feeling of faintness, or increased weakness, for some hours, and, at one time, slight coldness and want of circulation in the extremities followed it; but I am not at all sure that these were not mere coincidences. They led me, however, to use the chloroform in a dilute form, mixing it with from four to six parts of eau de Cologne. About half a drachm of this mixture on a handkerchief quite sufficed to afford relief, and, as he did not take it at first more than three or four times a week, the quan-

tity of chloroform inhaled was then very small ; yet it always enabled him *immediately* to take a long, full, deep breath, and he described the sensation of relief as "most luxurious." Latterly, as advancing disease led to a more frequent necessity for its employment, I thought the spirit in the eau de Cologne might affect his head. I therefore gave the chloroform pure. Afterwards, the "dead feeling" in the limbs and increased weakness was never observed, although the quantity of chloroform inhaled was much greater. He never took it, however, in such a quantity as to produce anything like insensibility. He was always perfectly conscious, and knew the exact moment when the necessary relief was obtained. If he continued the inhalation longer, he felt himself becoming a "little light about the head," and sometimes spoke for a few moments in a confused manner ; but I never observed, at any time, the least ill effect which could fairly be attributed to the chloroform. The pulse always became fuller and softer, but its rate was scarcely, if at all, affected.

During the last few days of his life those well known symptoms of ulceration of the trachea came on, which often render the termination of consumption so agonizing both to the patient and his friends. They led to the more frequent and almost constant use of chloroform, but in the same small doses, and with the same happy results. The intellect remained

perfectly clear until asphyxia was actually commencing, and he was most anxious that those suffering from his disease might find relief from the same remedy. He called it his "bottle of life." He was well acquainted with the physiology of respiration and circulation, was continually analysing his own sensations, and he said he felt perfectly sure, not only that the chloroform relieved some spasmodic closure of the air-passages, and allowed air to enter his lungs, but that the vapour itself "ventilated his blood" more than common air would do. Its effect was always certain and immediate. We never had to *hope* that the remedy would be effectual; we were always *certain* that, whatever the degree of dyspnœa, however great the violence of the cough, so long as we had chloroform, the means of relief were at hand, and we were never once disappointed.

I do not wish to add any speculations to a narrative which I intend as a plain statement of facts, still less to deduce any general conclusions from one case; but I may add, that I have employed chloroform in two cases of spasmodic asthma with similar good effects, and that I have never been able to trace the least ill effect to its use. Even if it were proved to produce such injurious effects as opium and other narcotics, I submit that this would be no valid objection to its employment, for the daily general use of these drugs, the benefit of which is often very

doubtful, shows that such ill effects are universally thought to be less than those likely to result from unrelieved cough and dyspnoea. I had more than one proof during the progress of the case just related, of the truth of the general belief, when, owing to accidental circumstances, no chloroform could be procured for some time. It must be remembered, also, that the period during which phthisis was running its course was much more than double the average length.

I must, in conclusion, express my hope, that in the use of chloroform we shall advance a step towards the cure of consumption, gaining time for the operation of other remedies by employing a safe palliative for the most urgent and distressing symptoms. Even should this hope prove fallacious, I feel confident that chloroform will diminish the sufferings of consumptive patients far more completely than any ordinary sedative.

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